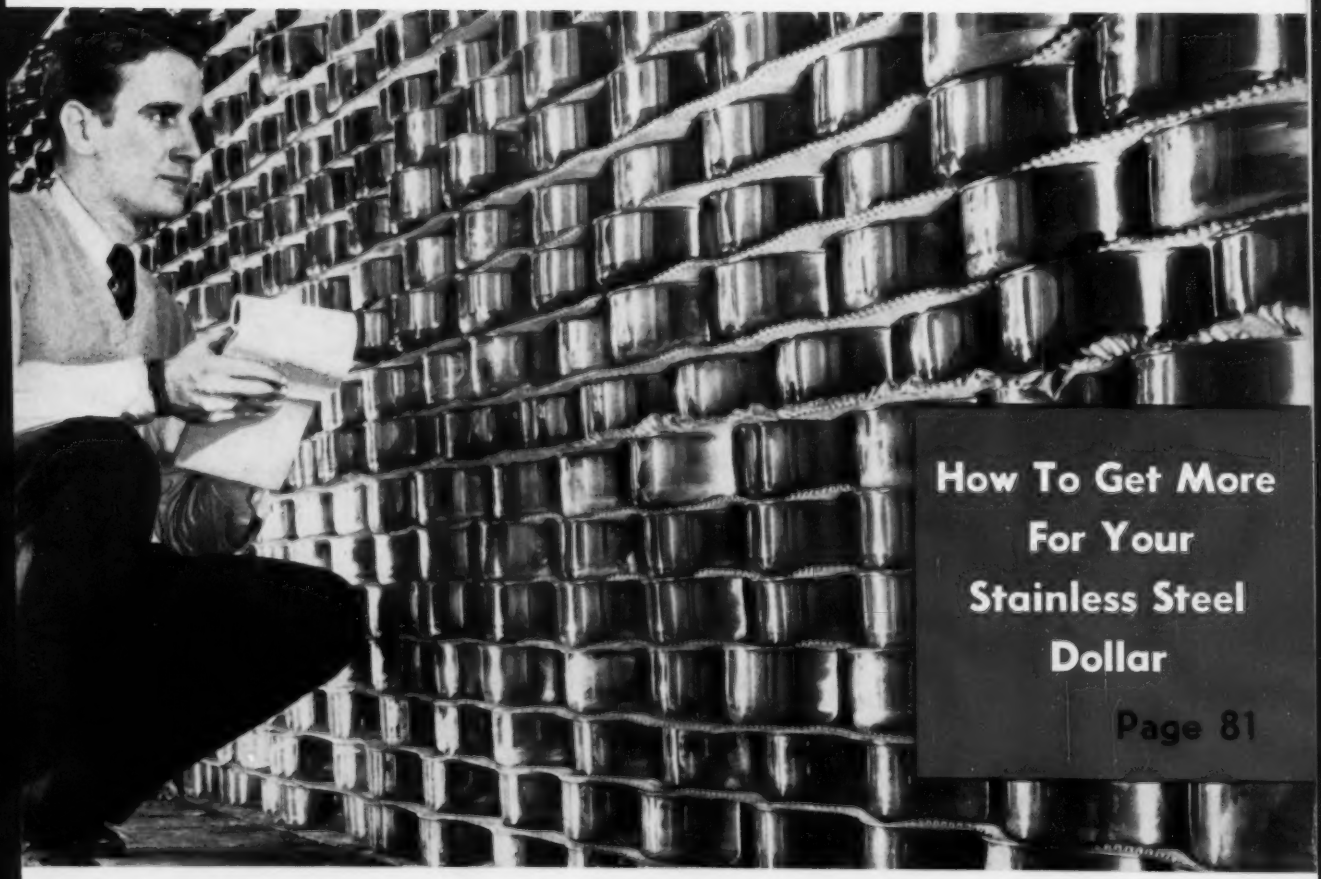
February 2, 1956

The IRON AGE

The National Metalworking Weekly



How To Get More For Your Stainless Steel Dollar

Page 81

Heads-Up Plant Protection Pays Off

P. 35

Check your hidden fringe labor costs 37
Are you a good boss? 38
Tips on good shop maintenance 41
How steel capacity shifted in '55 48

Digest of the Week—Page 2

COPPERWELD

Leaded Steels

The steel warehouse has long been an integral part of America's industrial distribution system. Through planned buying, the warehouse is in a position to supply "less than mill runs" and to fill orders for quick delivery on all types of steel.

Today, as a further service, most of America's steel warehouses are serving the increased demands for Copperweld Leaded Steels—the steel with "built-in productivity."

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NEW

SOURCES

Write for free booklet, "Lead Treated Steels."

COPPERWELD STEEL COMPANY • STEEL DIVISION • WARREN, OHIO

EXPORT: Copperweld Steel International Co., 117 Liberty St., New York 6, N. Y.

Truckload of bricks bundled in lots of 100 with strapping made by Signode Steel Strapping Co., Chicago, Ill.

Look what's happened to the hod-carrier!

A few cents' worth of steel strapping enables this fellow to wheel 100 bricks at a time around the job-site, where his predecessor carried only ten!

Yes, they work a lot of magic these days with that familiar packaging standby, steel strapping. Cargo handlers secure lading with it, warehousers bind pallet-ends with it, builders tie up forms for concrete columns with it. There appears no limit to the promotional imagination of steel strapping manufacturers.

The raw material for most steel strapping is hot-rolled coiled sheets. Steel-strapping manufacturers look to Bethlehem for a healthy mileage of this raw material. Strapping is one of the many uses of sheet steel which have grown into important consumers of Bethlehem sheets during recent years. Combine the many relatively new and fast-growing sheet uses with the longer-established ones, and you can understand why Bethlehem is being called on to turn out steel sheets in larger volume than ever before. We are making every effort to overtake the unprecedented demand.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM SHEETS

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

February 2, 1956—Vol. 177, No. 5

The IRON AGE

Digest Of The Week In Metalworking

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Copyright 1956, by Chilton Co. (Inc.)

THE IRON AGE, published every Thursday by CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1922, at the Post Office at Philadelphia under the act of March 3, 1879. Price to the metalworking industries only, or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single copies, 50¢. Annual Review Issue, $2.00. Cables: "Ironage," N. Y.

Address mail to The IRON AGE
Chestnut and 56th Sts. Philadelphia 39, Pa.

NEWS DEVELOPMENTS

PLANT PROTECTION CAN SAVE YOU MILLIONS P. 35

An alert plant protection force can save your company millions of dollars a year. Fire prevention and crime detection are only part of its job. Today's plant policeman must have brains as well as brawn.

FRINGE BENEFITS REACH BIG FIGURES P. 37

Cleveland survey shows that tiny fringe benefits add up to substantial part of worker's hourly rate. Companies over 1000 pay out 39.62 cents per hour in extras. Small things like bargaining time, coffee breaks, cafeteria costs, company awards all add up to big money.

ARE YOU POPULAR WITH YOUR EMPLOYEES? P. 38

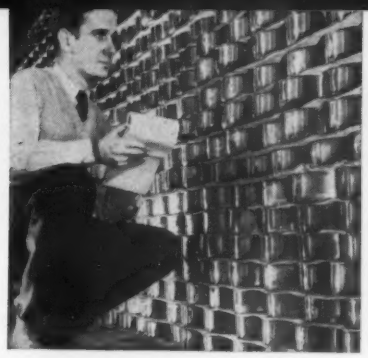
Recent survey of workers comes up with detailed checklist for employer popularity. Workers like a competent boss. They want a chief to be fair, considerate, pleasant. Women mention appearance and understanding.

L.P.F. MEANS MORE COPPER PER TON OF ORE P. 40

Early in 1957 Kennecott Copper Co. will initiate a new process at its Ray Mines Div. designed to squeeze an extra 2 lbs of copper from every ton of ore. This process could be used on any ore of similar composition and increase output by 12 pct.

PLANT MAINTENANCE COMES IN FOR NEW LOOK P. 41

Philadelphia meeting of plant engineers heard that many companies have more maintenance than production people today. New attention to maintenance is bringing forward ways to cut costs.



STAINLESS steel kitchen utensils, copper-clad, during manufacture at Rome Mfg. Div., Revere Copper & Brass. Story on stainless—P. 81.

TOOL RESERVE SWITCH STIRS SENATE PROBE P. 63

Recent move to release machines from the defense reserve and throw them into current production is drawing congressional and industry fire. Machine tool builders will give their views to Senate probers. Everybody wants to know exactly what's behind the recent policy reversal.

SPECIAL FEATURES

HOW TO GET MORE FOR YOUR STAINLESS DOLLAR P. 81

To say that stainless Type 304 is a far cry from a plain carbon steel is to state the obvious. Everyone knows the two are miles apart metallurgically. What is less obvious is that many of the controlling factors for purchasing stainless steels are equally distinct. So that applying your favorite set of "plain carbon" buying rules to stainless steel could be a costly mistake.

WHAT MAKES THE BUYING OF STAINLESS DIFFERENT?

For one thing, being able to make the most of the fine points of stainless chemical compositions. For another, understanding the three basic stainless metallurgical types. Stainless fabrication also calls for a fresh approach. The same applies to many of its engineering problems. To get a better stainless product at a tidier profit still requires getting the best from your purchasing, production and engineering teams.

WHEN YOU READ THIS SPECIAL FEATURE,

you'll know how it all adds up to getting the most for your stainless steel dollar. It's in two sections, for your reading convenience.

PURCHASING FACTORS

What are some of the important buying factors to be considered? On the one hand, there's stainless's unquestioned sales potential, to be weighed against its relatively high cost. Then there's its engineering potential—the special properties that make stainless so valuable. This section covers buying factors, metallurgy for P.A.'s, finishing extras, other extras, and how to narrow your selection.

PROCESSING TIPS

Once you've purchased your stainless, there's the matter of putting it to work, a production and engineering worry. What are the factors in turning, milling, welding, brazing, annealing? How about stress relieving, hardening? What of Grinding? Polishing? Drilling? Here's a round-up of the latest thinking and techniques for processing stainless steels.

MARKETS AND PRICES

INDUSTRIAL HEATING MEN GET SALES TIPS P. 39

Industrial heating group, meeting in Chicago, heard a customer outline key points in capital goods selling. Points covered include quotations, installation and preventive maintenance.

INDUSTRY USING MORE PRINTED CIRCUITS P. 43

Printed wiring was conceived for the army, but is growing up a civilian. Industry is using it more and more because it is faster and costs less. Follow production step-by-step in this pictorial presentation and you'll see specific advantages for yourself.

STEEL WAREHOUSES SEE STRONG SALES YEAR P. 44

Major industrial expansion and low inventories in fabricators' plants were among factors cited by a warehouse official as pointing to another big year. Getting enough steel will remain a warehouse problem.

IS AN AUTOMOTIVE DARK HORSE MOVING UP? P. 52

Within two years, Packard-Clipper Division has designed two new lines, a V-8 engine and a refined torsion bar suspension. Detroit observers remember the aggressive statement of the group, view moves with interest.

STRIKES KEEPING MARKETS OFF BALANCE P. 154

Labor stop-and-go moves kept major nonferrous markets off balance. Threatened strike in Malaya would seriously cripple world tin supply. Laurel Hill copper refinery still idle. Court order expected to halt Australian dock strike which had threatened zinc, lead supply.

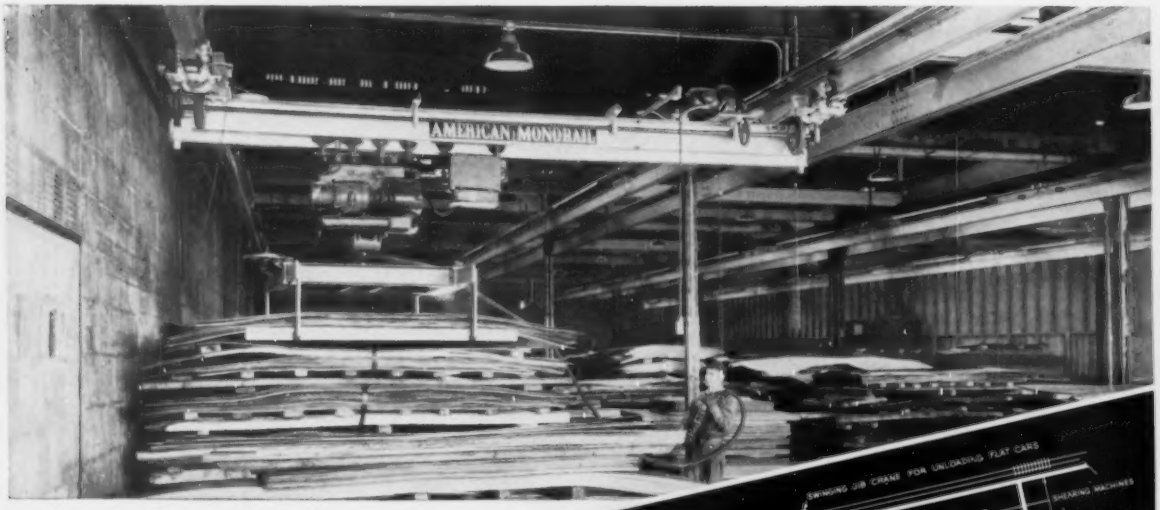
NEXT WEEK:

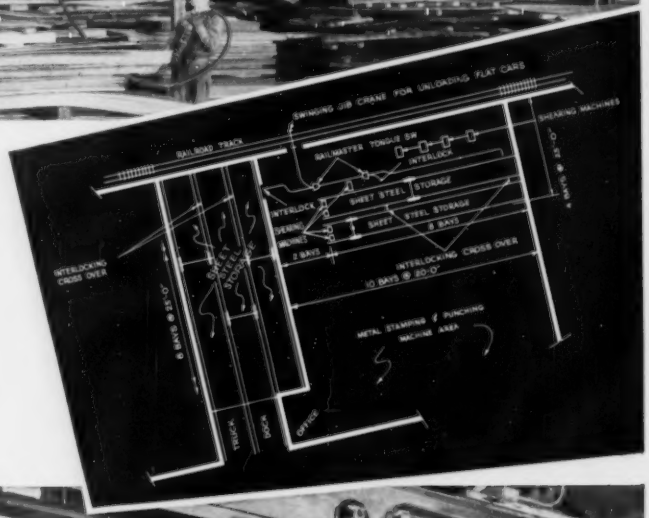
ARE REDS GAINING IN WORLD STEEL RACE?

Free world steel capacity still holds a comfortable edge over Russia and Iron Curtain countries. But the Reds have made substantial gains in last 10 years. Diversion of this output to war or to building up Russian economy poses problems for U. S. An expert analysis worth looking into.

TOOL DRILLS CAST IRON 10 TIMES FASTER

A new carbide-tipped drill whizzes through cast iron, low carbon steel, bronze and aluminum at feeds up to 60 ipm. At 15 ipm, feed, hole tolerance is within 0.0002 in., surface finish is a smooth 4 micro-inches. Hollow drill produces both chips and a solid core.





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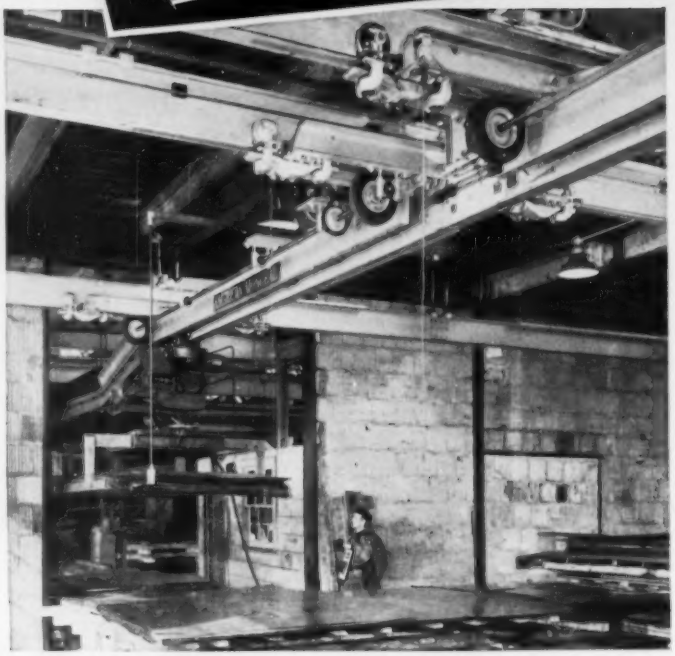

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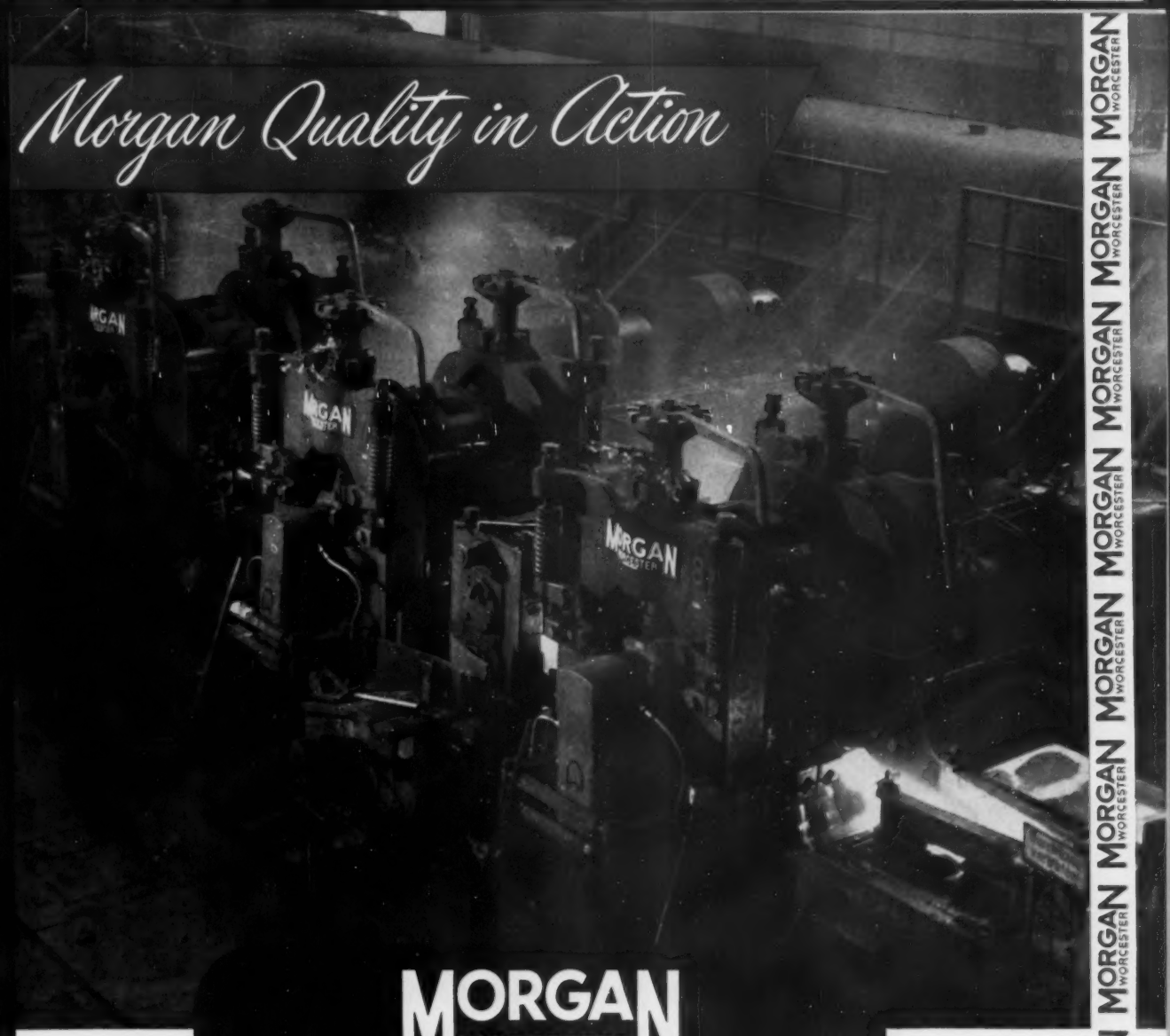
Morgan Quality in Action



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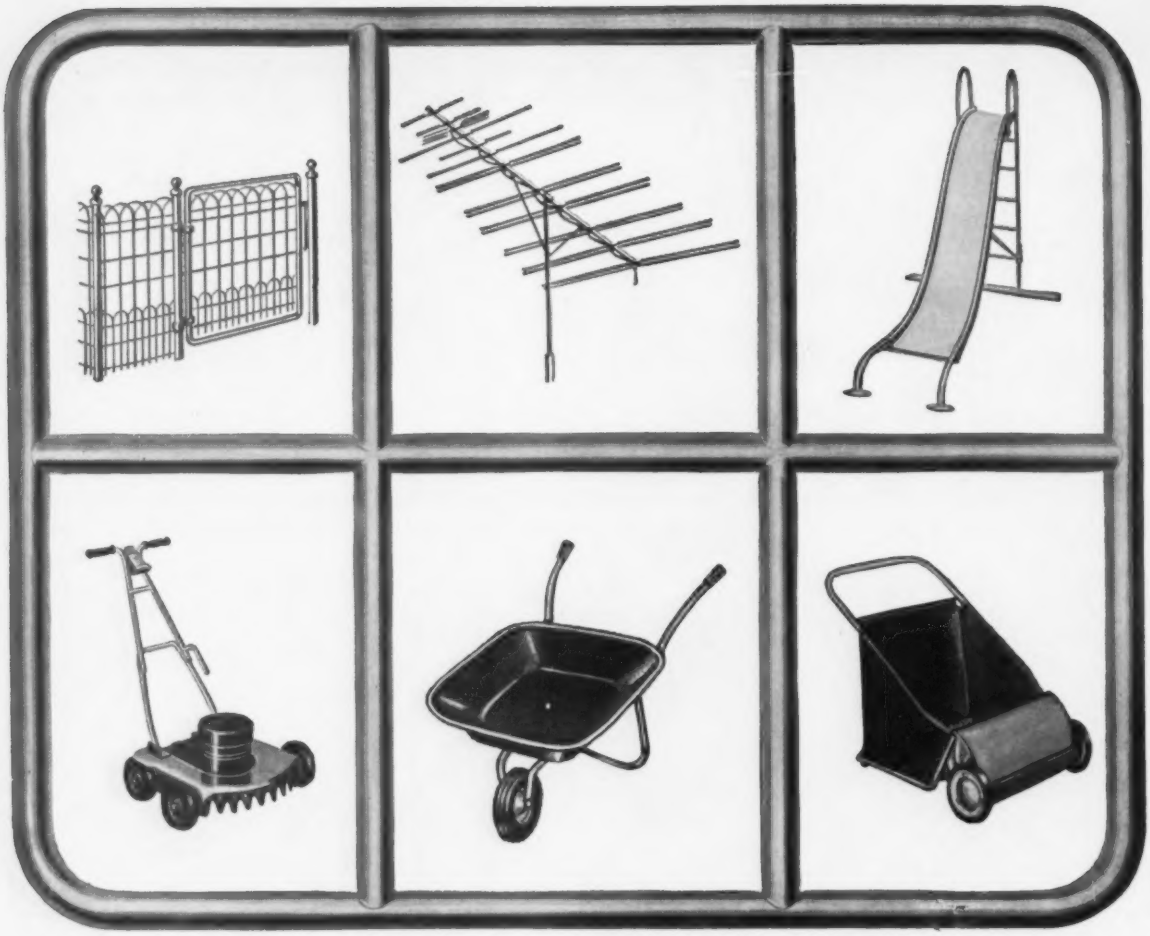

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Indexed in the Industrial Arts Index and the Engineering Index.

EPA NBP

EDITORIAL

The President Needs Your Prayers

◆ THERE ARE MANY who clamor for President Eisenhower to "run again" before they think things through. Others fervently wish he would run again but they hold their pleas because they recognize what he is up against.

Millions have adopted the do or die attitude on whether Ike should run again. The argument goes something like this: Ike is a soldier, he knows his duty, his duty is to his country; ergo, he must run again and be elected. Very simple—for those holding that viewpoint. Of course there is something to be said for such reasoning—but not too much.

The fact is that Mr. Eisenhower is regarded—even in the other political camp—as one of the greatest leaders of the people to come down the pike for a long time. He is simple, direct, and yet complex. Complex to some because he is so unaffected where truth and honesty of purpose and spirit are involved.

Because of his character and leadership, millions of people do not seem to realize the problem of Mr. Eisenhower as a mortal every-day man. He knows what his duty is to his country. He doesn't need anyone to tell him that. He knows too that the party is often inhuman with its natural leaders.

Many may not realize that President Eisenhower is starkly alone in making up his mind what to do about the nomination. He has had the heart attack. Few, other than those who have had one, know what goes on in the mind shortly after the attack and later when things begin to look more normal.

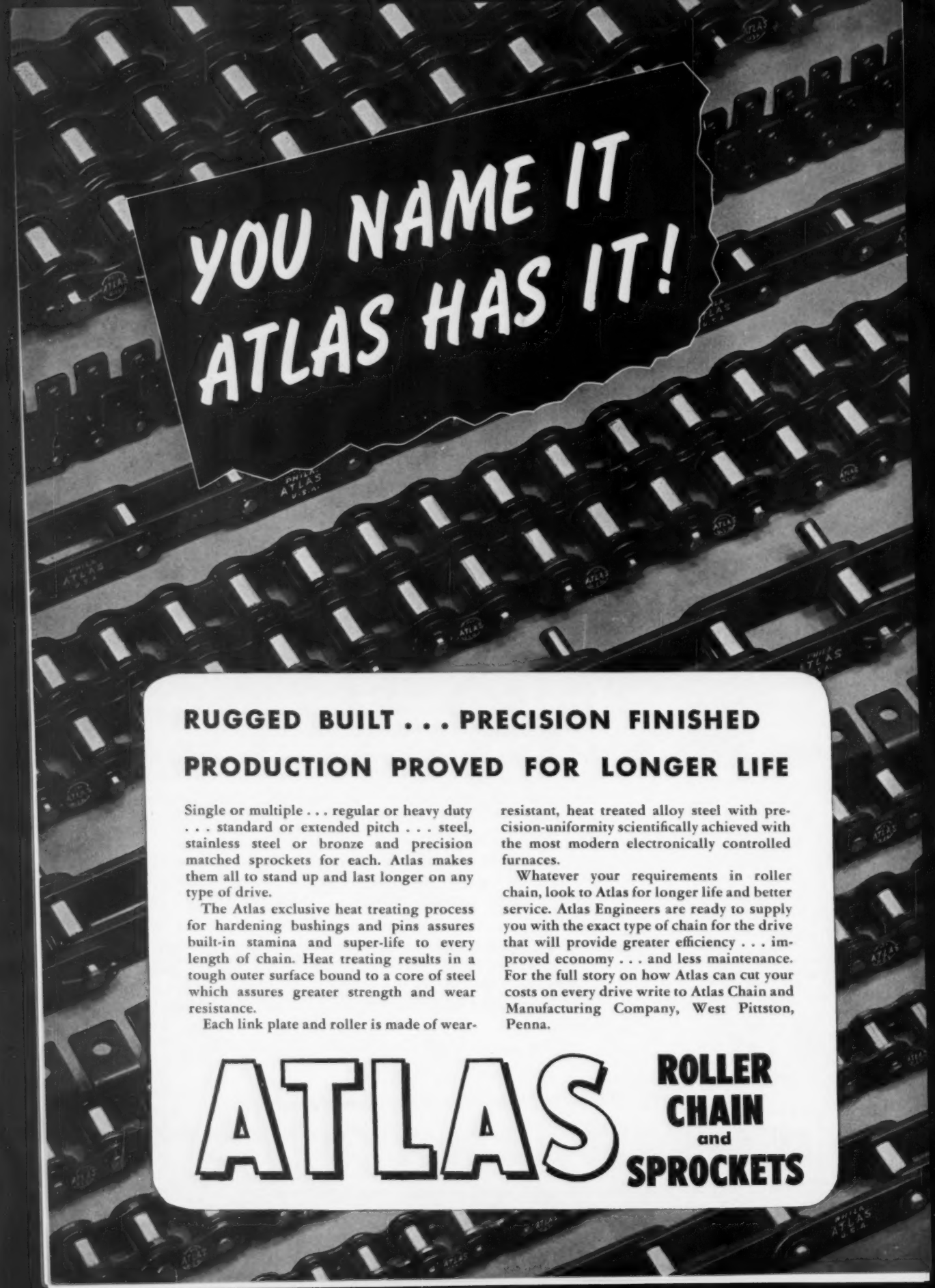
Statistics on coronary heart attacks are not good reading for one who has been affected. The doctors are far from agreement on causes of heart attacks; chances of recurrence and the longevity probability.

President Eisenhower may be considering the duty factor from a far different angle than most people. He may be wondering whether it is his duty to accept the nomination if, in his opinion, there is a chance he might not finish the job. He is that kind of a man.

The President needs your prayers not your pressure.

Tom Campbell

EDITOR-IN-CHIEF



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dear editor: *letters from readers*

The Military

Sir:

Mr. George Baker, Washington Editor of Chilton Publications, sent me a pre-print of the editorial in IRON AGE titled "Are We Unfair to Our Military?"

I think this is a splendid piece of writing. It will be of appreciable assistance to us in overcoming the existing unfavorable attitude of the public toward military service as a career. With your permission, we will run a reprint of your editorial in our Service publications.

As you point out, the exodus of trained personnel from our Armed Forces deeply concerns us. A high rate of personnel turnover is perhaps the single most important deterrent to proficiency.

You are quite correct in directing your message towards the businessman. Continuing pressures from groups of private business interests have contributed to our problem. A change in this attitude would, indeed, be helpful. *C. L. Burgess, Assistant Secretary of Defense, Manpower, Personnel and Reserve, Washington, D. C.*

See also "Congressional Record," Jan. 12, p. A270.—Ed.

Reciprocity

Sir:

In your issue of December 15, on page 83, you wrote of "the apparent lack of reciprocity in tariff reductions that foreign nations offer in return for U. S. concessions." You went on to say that England bars the importation of any machine tool if a similar class or kind is produced in that country.

It is to be regretted that so misleading a statement should have been offered to the readers of a journal having the high reputation enjoyed by THE IRON AGE and I hope you will give them an opportunity of perusing a correction to the statement referred to.

Great Britain does not bar the importation of machine tools. An import license is necessary, however, in the case of imports of items costing dollars and such an import license is not issued if the item, whether it be a machine tool or anything else, is not essential to the industrial life of Great Britain. One test of essentiality is, of course, the availability of a satisfactory alternative, whether of British or of other make, which does not cost dollars.

The import licensing system was instituted and is maintained solely for the preservation of our balance of payments position and not in any sense for the protection of the British machine tool or any other industry.

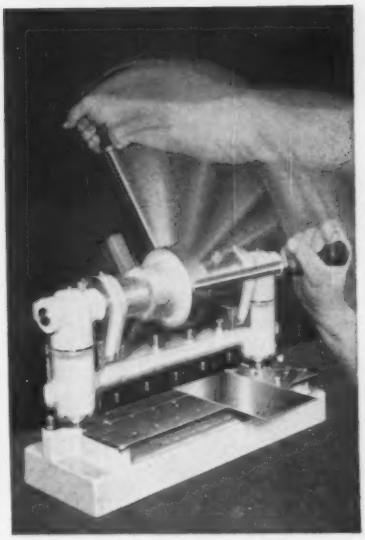
During the first eleven months of 1955 metalworking machine tools to the value of £5.9 million (out of a total of £15.3 million) were imported into Great Britain from the United States of America, and the greater part were admitted without the payment of any duty whatsoever.

As to reciprocity, it would be interesting to know what other country, including the United States of America, admits foreign machine tools without any duty payment. *W. J. Morgan, General Manager, The Machine Tool Trades Assoc., London, England.*

New Cover

Sir:

Congratulations! After seeing your January 5th and 12th issues of IRON AGE, I felt obliged to take the pen in hand and compliment you upon the fine looking covers. Your excellent cover designs are most fitting for the editorial standards exhibited within the pages of the book. *A Habbel, Press Information Service, Chrysler Corp., Detroit, Mich.*



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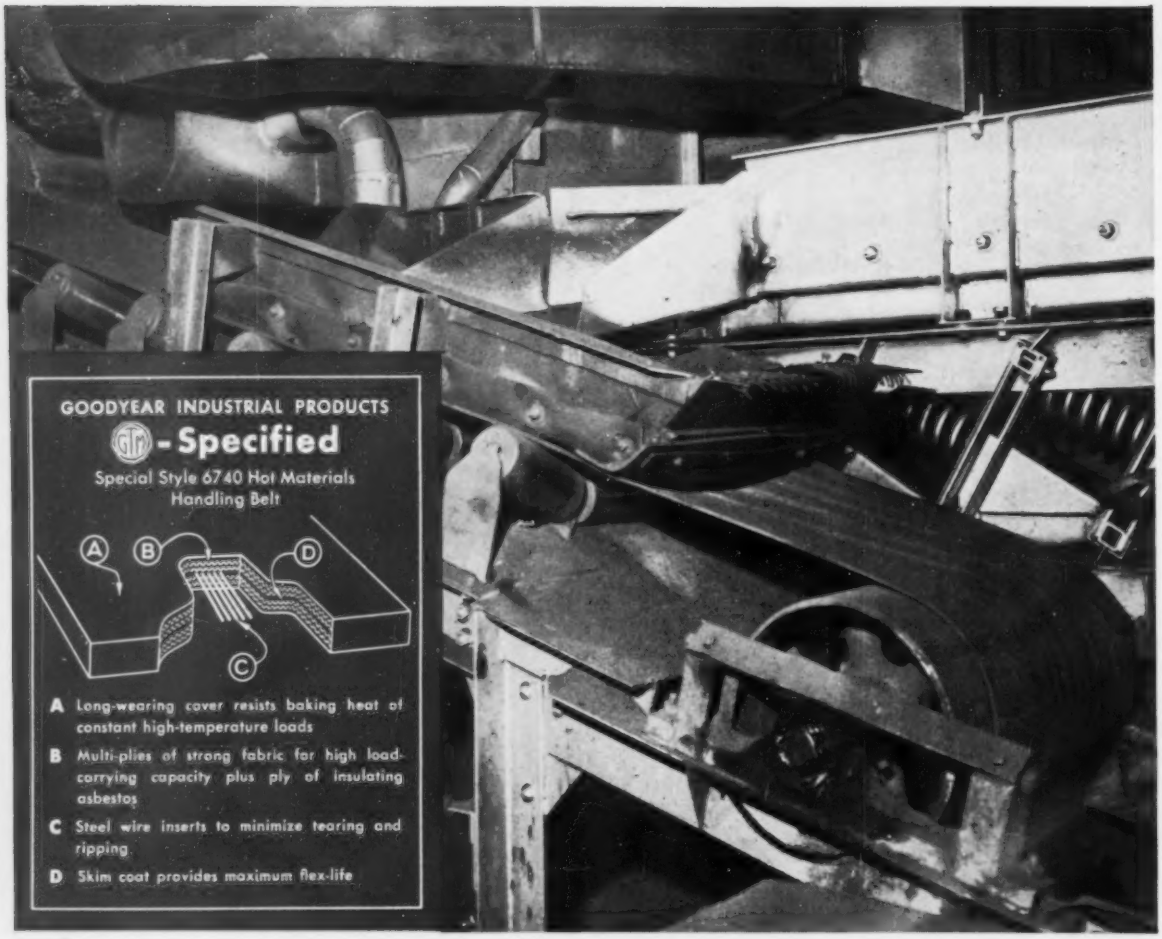
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G.T.M. Saves $4000/year on shake-out refuse belts

SHARP, hot shot, gates, risers and other scrap quickly tore and burned up refuse-handling belts at this automotive foundry. On the average, the 126′ belts only lasted two months. Usually large patches had to be put in the belt to get even two months' service.

Special, wire-inserted belts (see blueprint) and vulcanized, rather than steel-plate, splices were suggested by the G.T.M.—Goodyear Technical Man. Result: *Service averages six months with $4000 annual savings.*

Your belt or other industrial rubber problems may be similarly solved by the G.T.M. and your Goodyear Distributor. Call them, today! Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

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fatigue cracks

by William M. Coffey

Try Again

Recently a Lockheed official gave the following illustration of the meaning of supersonic as applied to one new fighter plane:

"This plane could be cruising along, minding its own business, and be fired at by a 16-inch Naval gun. If the pilot should happen to see the shell, he could avoid it, swing alongside to inspect it—then accelerate away from it—going in the same direction as the shell."

The unlimited possibilities of a trick like this are unlimited. Imagine. The pilot could ride alongside at same speed, reach out and grab the thing and take it back to the ship, drop it in the gunners mate's hands, "Found this thing, thought it belonged to you. Cheerio, I'm off again." One dead pilot. We know gunners mates. Or, they could even work out a new football play—something off the single wing. Unlimited possibilities.

Dates to Remember

February again and what a month. More good excuses to celebrate! Not only George Washington's and Lincoln's birthdays but these others too:

February 1-29 Cherry-Vanilla Sell-A-Bration (lasts all month, even)

February 2-11 Kraut and Frankfurter Week

February 10-20 National Pimiento Week

February 12-18 National Beauty Salon Week

February 15-22 National Canned Salmon Week

February 15-22 National Cherry Week

February 18-25 National Sew and Save Week

February 19-25 International Wheat Bread for Toast Week

*This last one is praiseworthy. As you notice it has that popular international flavor and, we understand, a hint of censure has leaked from a UN committee (we think it's the WDUSTTBFI (why-doesn't - the - US - toast - their - bread-for-India committee) unless we all pitch in. So let's get on this one, fellows.

Puzzlers

That darn dog and rabbit puzzler (Dec. 15). G. Bach who submitted the puzzler says that little rabbit will be dead in 17 1/7 secs. but most came up with 11.3 secs. C. W. McKinley played it smart and said "approximately 15 secs." We sort of lean towards the 17 1/7 answer because John Prion, Chief Engineer of Pittsburgh Gear, sent a detailed answer with the following preface: "The curve that the dog follows is called a pursuit curve, and to find the equation to this curve a guy must know something about that fancy stuff the high brows call calculus. It sure wants to make you throw in the towel and turn your face to the wall. Anyway the final result for the equation of the curve comes out." If the 11.3ers want to argue with Mr. Prion drop him a line at Neville Island, Pittsburgh 25, Pa. The 11.3ers are as follows: M. E. Stratton, Vice President, Mountain State Steel Foundries; Evelyn Roberts, Case Institute of Technology; and I. M. Darcey. Charlsie and the General Steel Castings Iron Age Puzzle Club submit 15.9 which comes closest to substantiating Mr. McKinley.

New Puzzler

If Eustace gave Angus a mule, Eustace would have twice as many mules as Angus. Or, if instead of that, Angus gave Eustace a mule they would both have the same number of mules. How many did each have to begin with?

3 important reasons you should use STAR "Moly"® High Speed Steel Blades

1 They outlast standard steel blades 10 to 1!

2 They assure high speed cutting performance second to none.

3 They are substantially lower in cost than any other type high speed steel blades!

Star was the first to successfully use molybdenum to make "Moly"® High Speed Steel Blades that would be tough, carry the load, retain sharpness and embody all the other high qualities and properties of heavy-duty blades. Order "Moly" High Speed Steel Blades from your Industrial Distributor. Rely on him for *all* your metal-cutting needs. Remember, he carries the complete line of STAR Hand and Power Hacksaws, Metal and Wood Cutting Band Saws and Hacksaw Frames.

FREE Ask your Industrial Distributor for a supply of our NEW Metal Cutting Booklets and Wall Charts.

Sold Only Through Recognized Distributors

CLEMSON

CLEMSON BROS., Inc.

MIDDLETOWN, N. Y., U. S. A.

Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Lawn Mowers.

GET TRIPLE ACTION

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THE SOLVENT

That Does MORE Jobs For You!

IMMUNOL cleans, degreases and rustproofs ferrous metals in one fast, easy operation . . . is low in cost, non-toxic, non-flammable

. . . And ELIMINATES FLAMMABLE SOLVENTS

ONE GALLON OF IMMUNOL MAKES 33 GALLONS OF SOLVENT

It mixes with hot or cold, hard or soft water and can be applied by any method now in common use. It can be used over and over again. Foreign matter is floated to the surface where it is easily removed.

IMMUNOL is very economical . . .

can be applied by any method

and has many uses

You Can Use IMMUNOL . . .

as a bucket solvent, replacing kerosene, to clean metal parts and equipment; to replace vapor degreasing; to improve alkali cleaners; as a rust preventive; to prevent water marks after plating; to increase tool life in machining operations; to remove gum deposits in oil operated hydraulic and lubricating systems; for quenching, hydrostatic testing, magnetic inspection, and for general plant housekeeping.

Test IMMUNOL at our expense. Write for a free sample today.

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Original Products and Processes

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dates to remember

FEBRUARY

NATIONAL INDUSTRIAL ELECTRIC HEATING CONFERENCE — Annual meeting, Feb. 6-10, Netherland Plaza Hotel, Cincinnati, O. Society headquarters, 420 Lexington Ave., New York.

PRIVATE TRUCK COUNCIL OF AMERICA, INC.—17th annual convention, Feb. 9-10, Cleveland Hotel, Cleveland. Society headquarters, Sheraton Bldg., Washington 5, D. C.

AMERICAN SOCIETY OF CIVIL ENGINEERS—National winter convention, Feb. 13-17, Dallas, Tex. Society headquarters, 39 W. 39th St., N. Y.

EXPOSITIONS

ASTE—Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

AMERICAN MANAGEMENT ASSN.—Mid-winter personnel conference, Feb. 15-17, The Palmer House, Chicago. Society headquarters, 1515 Broadway, New York.

THE DROP FORGING ASSN.—Industry meeting, Feb. 16-17, Park Sheraton Hotel, New York. Society headquarters, 734 Union Commerce Bldg., Cleveland.

INSTITUTE OF SURPLUS DEALERS, INC.—11th annual trade show and convention, Feb. 19-21, 212th AAA Armory, N. Y. Society headquarters, 673 Broadway, N. Y.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS—Annual meeting, Feb. 19-23, Hotels Statler and New Yorker, N. Y. Society headquarters, 155 E. 44th St., N. Y.

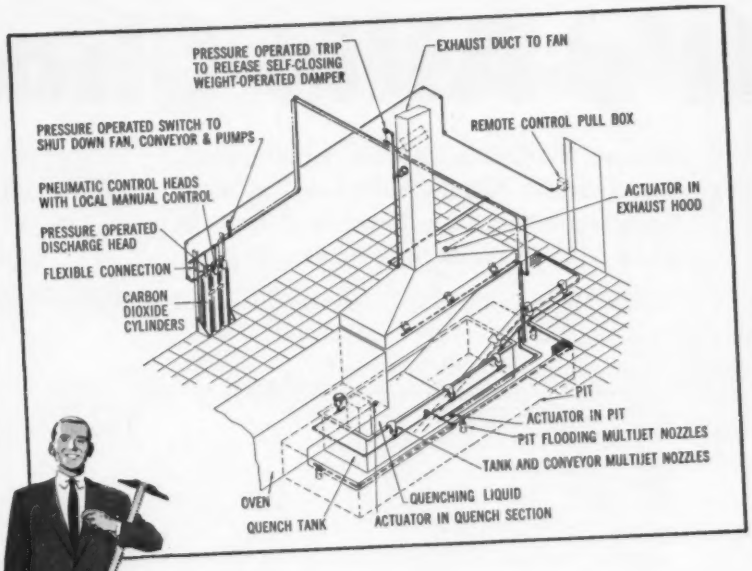
ASSN. OF IRON & STEEL ENGINEERS—Annual West Coast meeting, Feb. 20-22, Hotel Statler, Los Angeles. Society headquarters, 1010 Empire Bldg., Pittsburgh.

MARCH

NATIONAL ASSN. OF CORROSION ENGINEERS — National conference and exhibition, March 12-16, Hotel Statler, N. Y. Society headquarters, 155 E. 44th St., N. Y.

PRESSED METAL INSTITUTE—Annual spring technical meeting, March 14-16, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

STEEL FOUNDERS' SOCIETY OF AMERICA — Annual meeting, March 19-20, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.


PRESSURE OPERATED TRIP TO RELEASE SELF-CLOSING WEIGHT-OPERATED DAMPER
EXHAUST DUCT TO FAN
PRESSURE OPERATED SWITCH TO SHUT DOWN FAN, CONVEYOR & PUMPS
REMOTE CONTROL PULL BOX
PNEUMATIC CONTROL HEADS WITH LOCAL MANUAL CONTROL
ACTUATOR IN EXHAUST HOOD
PRESSURE OPERATED DISCHARGE HEAD
FLEXIBLE CONNECTION
CARBON DIOXIDE CYLINDERS
PIT
ACTUATOR IN PIT
PIT FLOODING MULTIJET NOZZLES
TANK AND CONVEYOR MULTIJET NOZZLES
OVEN
QUENCH TANK
QUENCHING LIQUID
ACTUATOR IN QUENCH SECTION

HAZARDS LIKE QUENCH TANKS... NEED THIS SPECIAL FIRE PROTECTION!

IN THE PLAN ABOVE, you see a typical Kidde fire extinguishing system installation for the protection of one of industry's most dangerous fire hazards. However, *all* Kidde quench tank installations are not exactly like this one, since Kidde treats each quench tank as a *special* hazard which requires *special* fire protection!

Using safe, efficient carbon dioxide, Kidde systems snuff flames quickly, cleanly. The CO_2 leaves no mess to harm machinery or equipment, will not even damage work-in-process. And, thanks to patented Kidde rate-of-temperature-rise detectors, Kidde systems remain on guard 24 hours a day, completely independent of outside power sources.

Kidde systems use no clumsy mechanical triggering methods, have no falling weights. Pneumatic or Electrical Control Heads insure instant and complete CO_2 discharge. The moving parts of a Kidde system are self-enclosed for safety, need no replacement after a fire, have easy-to-read visual indicators which show at a glance if system is "set" or "released." What's more, special Directional Valves on the Kidde system let you protect more than one hazard from the same cylinder bank, giving you the most versatile protection on the market!

Without obligating yourself in any way, let the Kidde man analyze the fire hazards in your plant. Then let him show you our recommendations. For more information, write Kidde today.

Kidde

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249 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada, Ltd.
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The words 'Kidde', 'Lux', 'Lux-O-Matic', 'Fyre-Freez' and the Kidde seal are trademarks of Walter Kidde & Company, Inc.

It's Allis-Chalmers .

Motors, M-G Sets, Control, Switchgear... Dependable Allis-Chalmers Electrical Equipment Plays an Important Role in Steel Mill Expansion Programs

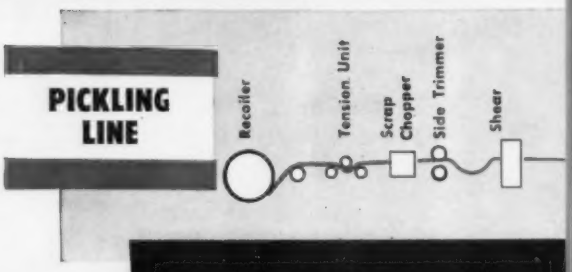
Demand for specialized steel remains at a record high. Steel producers are meeting the challenge with improvements on existing processing lines, or installation of new facilities for pickling and annealing operations.

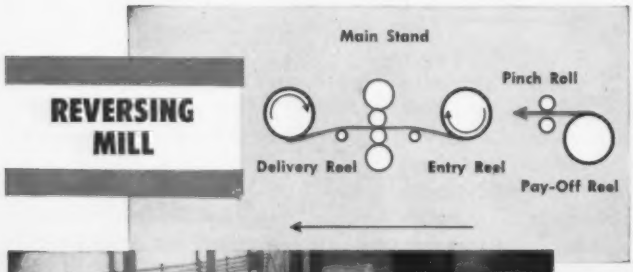
A recent installation of this type in an eastern steel mill featured Allis-Chalmers motors, m-g sets, control and operating stations, and switchgear throughout.

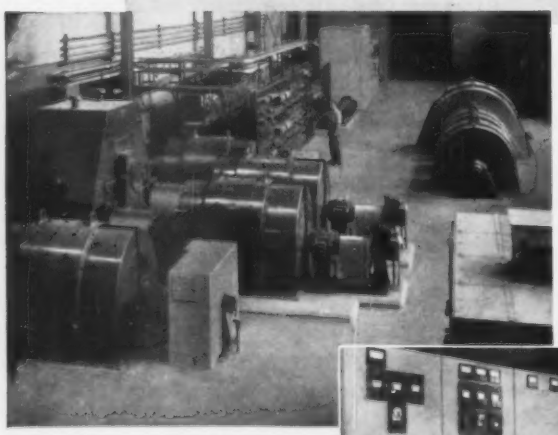
Allis-Chalmers equipment was chosen for this duty because of its record of quality, economy, durability . . . proven in years of heavy-duty steel mill operation.

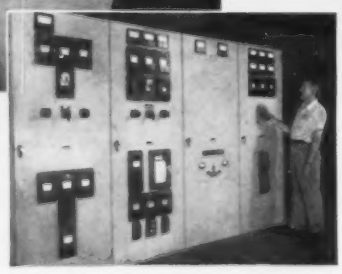
Take advantage of Allis-Chalmers wide range of equipment and service. For help in planning new facilities or modernizing present plants, contact the A-C office in your district, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4872

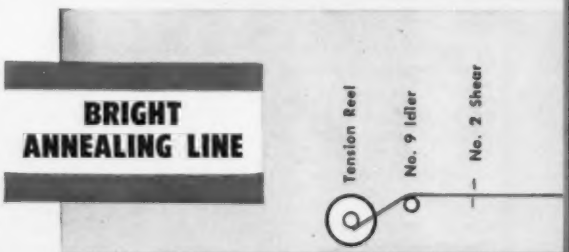








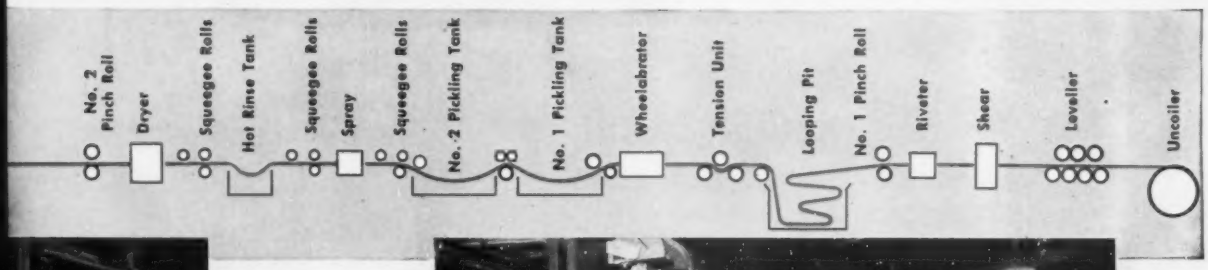
Overall view of new reversing mill motor room showing main motors, m-g sets, control, and 11,000/480-volt substation. Inset shows Allis-Chalmers 15-kv high voltage switching equipment for the motor-generator set and substation.



Delivery end of new annealing line. Allis-Chalmers desk-type operators' control stations, as shown here, are used throughout these modern new facilities.

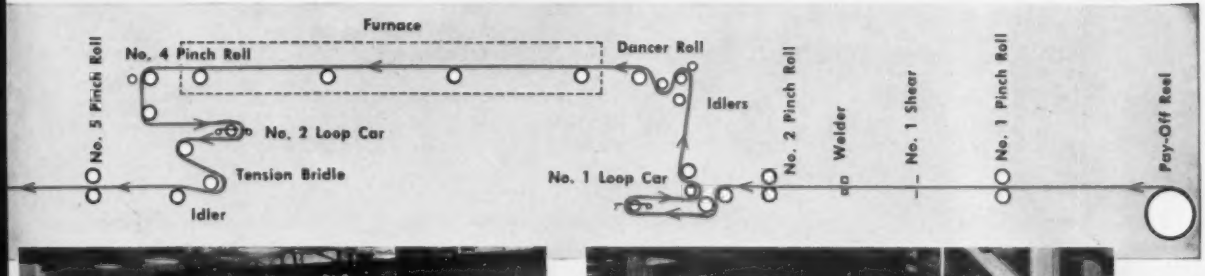
ALLIS-

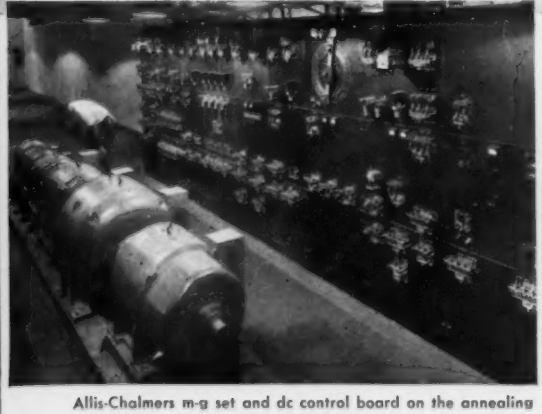
. All Along the Line



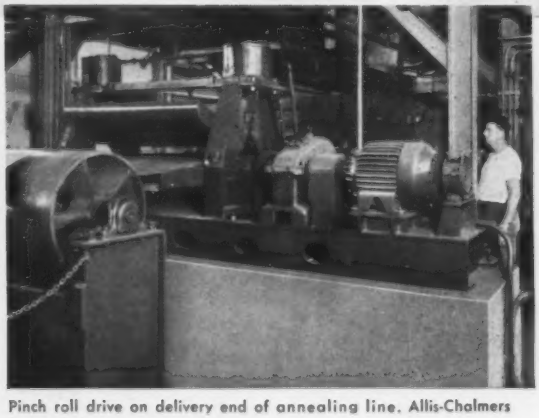
Operator's station, entry end, 36-inch hot-rolled pickling line. Allis-Chalmers control, initiated from desk, gives positive, precision control of material speed.

Allis-Chalmers dc control board and metering panels, m-g set, on delivery section of the pickling line.



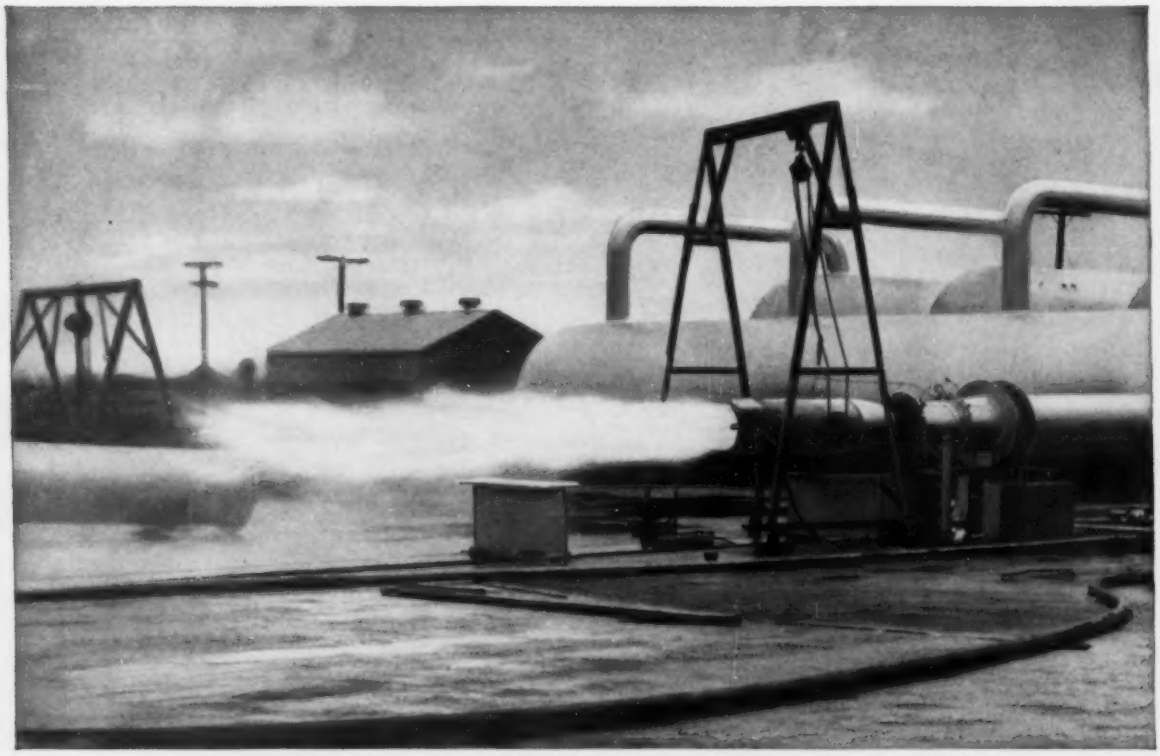


Allis-Chalmers m-g set and dc control board on the annealing line. Allis-Chalmers m-g sets and controls are recognized in the steel industry for dependable, economical service.



Pinch roll drive on delivery end of annealing line. Allis-Chalmers fan-cooled motors drive various parts of the processing line.

CHALMERS A-C ALLIS-CHALMERS



Ramjet tailpipes withstand severe abuse. (*Photo courtesy Marquardt Aircraft Company*)

MULTIMET Alloy Controls the Blast of Ramjet Engines

Tailpipes used to direct the searing blast of power in today's ramjet engines must withstand temperatures in excess of 2000 deg. F, plus severe vibration. High-speed ramjets operate in the neighborhood of 1500 mph. At these high speeds, vibration is almost as serious a threat to tailpipe life as heat. Because of its strength at high temperatures, MULTIMET alloy has given good service in tailpipes that vibrate as much as three inches.

Ramjet tailpipes are made of MULTIMET alloy sheet that is only 0.051 to 0.078 in. thick. The combined high-temperature strength and oxidation resistance of MULTIMET alloy permits the use of lightweight tailpipes with good heat-transfer properties.

MULTIMET alloy is one of many HAYNES alloys capable of extending the life of parts used at high temperatures. For literature describing the properties of HAYNES high-temperature alloys, get in touch with the nearest Haynes Stellite Company Office.

HAYNES TRADE-MARK ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

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A SUNDAY DRIVE ON 32 SPOT WELDS

YES . . . even your automobile wheels are assembled with Sciaky Resistance Welding

Every weekend millions of families just like yours take their Sunday drive in automobiles with spot welded wheels!

Every *day* of the week outstanding manufacturers like Motor Wheel are turning out thousands and thousands of those wheels with Sciaky patented Three-Phase resistance welding . . . faster and at lower cost than ever before!

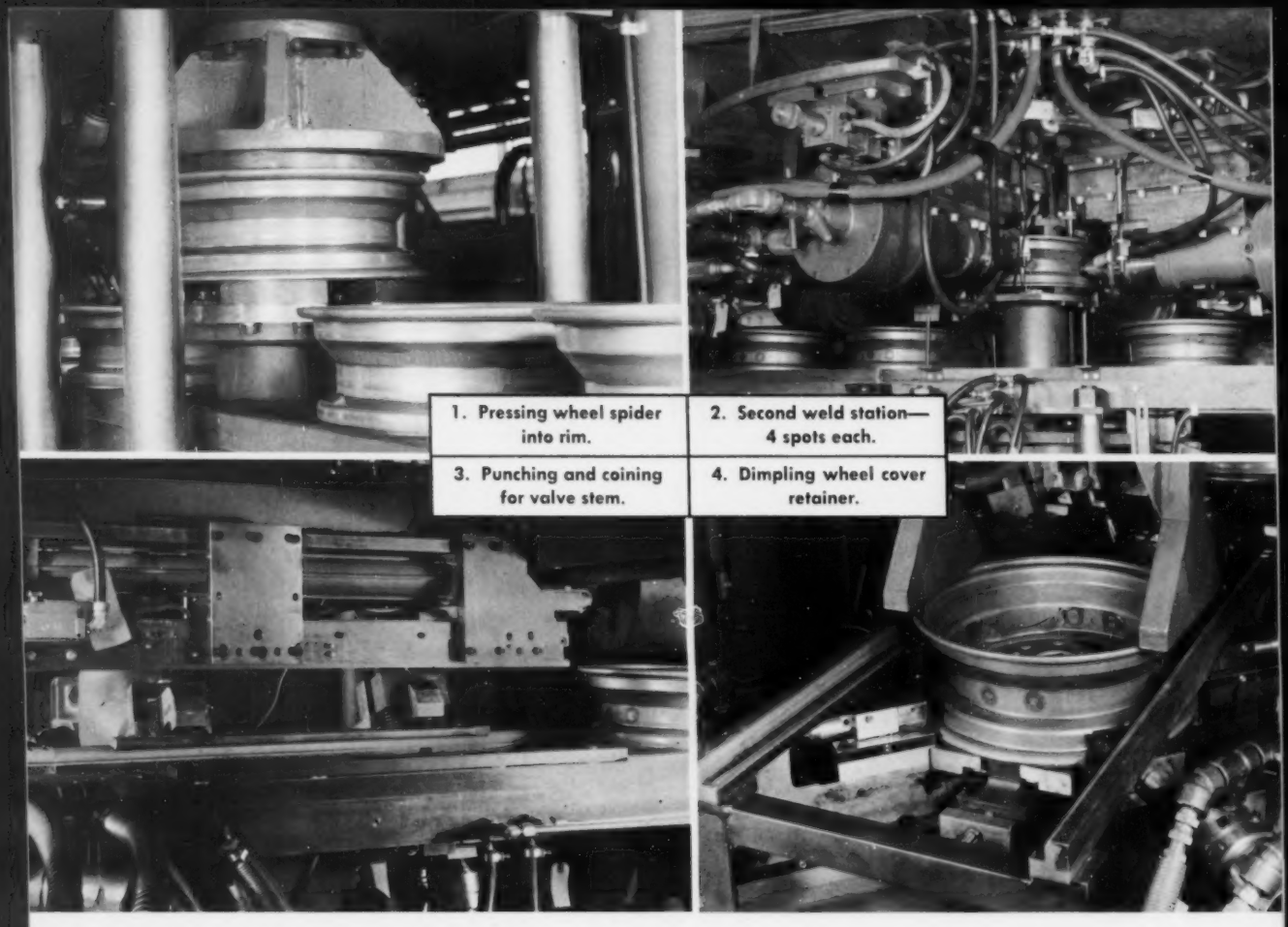
And as for *quality* — years of exhaustive testing proved eight Sciaky spot welds better than the previous twelve precision rivets.

Whether *you* make automobile wheels or not, if you *do* join metals in production . . . if you want it faster and better and at lower cost . . . see about Sciaky resistance welding — just like the wheel people did!

SCIAKY®

Largest Manufacturers of Resistance Welding Machines in the World

Turn the page for the impressive details of this tremendous improvement in wheel fabrication ▶



1. Pressing wheel spider into rim.
2. Second weld station—4 spots each.
3. Punching and coining for valve stem.
4. Dimpling wheel cover retainer.

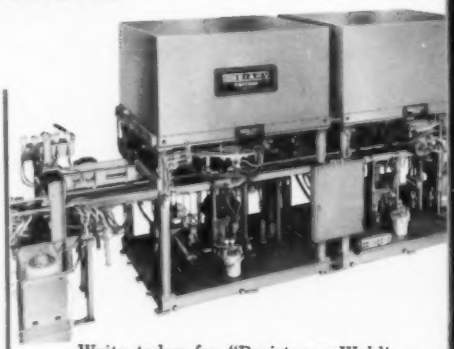
Sciaky Resistance Welding Techniques readily satisfy critical primary structures

with weld integrity and consistency in high production

Today Motor Wheel and other leading manufacturers are fabricating critically stressed automobile wheels with eight Sciaky Three-Phase spot welds instead of the previous twelve precision rivets. The elimination of the holes for rivets or other mechanical fastenings satisfies the air-tight requirements for tubeless tires as well.

A true example of automation, fully automatic Sciaky equipment includes press assembly of parts, piercing and coining of valve hole, and dimpling wheel trim retainers. Skilled labor no longer needed is made available for other important operations.

This tremendous advance in design concept and production methods is the result of years of exhaustive testing and development. Only Sciaky patented Three-Phase balanced load welding with 85% power factor (compared to 30% for conventional unbalanced load single phase) provides the integrity and consistency necessary to critical wheel assembly.



Write today for "Resistance Welding At Work," Vol. 4—#9, completely describing this outstanding application—yet another fine example of Sciaky basic thinking . . . resistance welding techniques to do *more useful work* at *lowest operating cost* with *maximum reliability.*

Largest Manufacturers of Resistance Welding Machines in the World

SCIAKY®

Sciaky Bros., Inc., 4914 W. 67th Street, Chicago 38, Illinois, POrtsmouth 7-5600

Large diameter coils leaving the temper mill at our Indiana Harbor Works, East Chicago, Ind.

The Big Coil Lineup

Such a lineup of big coils is an everyday sight in our cold reduced sheet mill. With complete integration of steel production from ore mines to shipping platform and with modern manufacturing facilities, we have unusual flexibility to meet any requirements on cold rolled sheets and strip. Quality control and physical specifications are no problem.

If your operation calls for cold rolled products of close uniformity and unvarying high quality, we would like to talk to you. Telephone the Youngstown District Sales Office near you or write the home office. The earlier we can discuss your requirements, the better we may be able to serve you in the coming months.

Youngstown COLD ROLLED SHEETS AND STRIP

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Low permanent growth from iron-oxide attack minimizes end wall buckling and spalling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. High MgO content in end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

CHEMICALS
KAISER
REFRACTORIES

Expansion tests show why you get SUPERIOR END WALL SERVICE with Kaiser Periclase-Chrome Brick

ONE REASON why Kaiser Periclase-Chrome Brick assures better end wall service for many leading steel producers is shown by this laboratory test of the effect of steel plates on permanent growth.

In this test, pre-fired 9x4½x3" bricks of two types were compared: brick having a chrome-magnesite ratio of approximately 75 to 25, and Kaiser Periclase-Chrome Brick.

Both types of brick were laid up as headers, forming the side walls of a tangentially fired pot furnace. 16-gauge steel plates were applied to the four sides of the bricks. The bricks were set loosely, with only 4 courses of brick overlaying the test pieces.

The effects produced in the laboratory were the result *solely of the heating and iron oxide reaction*. Heating and atmosphere conditions were identical on each type of brick. The furnace was heated with gas to 3100°F. ± 25°, and held at this temperature for 16 hours. Heating and cooling was at the rate of 75°F. per hour to minimize thermal spalling effects.

Results of the test

After cooling, the bricks were separated and photographed. (See picture.) Note strings stretched from top corners of new brick on ends of each row. Comparative growth on hot faces of brick shows above strings. The upper row of brick is the chrome-magnesite type. The maximum linear cold expansion of these bricks was 1" or 11%, with an average of 9%.

The lower row of bricks are Kaiser Periclase-Chrome. The maximum linear cold expansion of the Kaiser brick was only $\frac{3}{16}$" or 2.1%, with an average of only 1.4%.

These values are in addition to the reversible thermal expansion, in each case.

Also, note in the picture the cracking of the chrome-magnesite type brick caused by the relatively great iron-oxide swelling. The Kaiser Periclase-Chrome Brick is free from such cracks.

The superiority of Kaiser Periclase-Chrome Brick

This test indicates only one of many reasons why Kaiser Periclase-Chrome Brick gives hearth operators better end wall service.

The special composition of Kaiser Periclase-Chrome Brick assures less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag. This superior brick can greatly increase end wall life or greatly reduce wall thickness to cut costs, when end wall service is balanced.

Call or write any of the sales offices listed below for immediate attention to your end wall particular problems.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

- Periclase Brick (D-S)
- Periclase Chrome Brick
- Chrome Periclase Brick

SPRING STEEL RING

9″ O.D. x 6¼″ I.D. x .091″ 50 pieces (100 surfaces) per hr.; .004″ stock per side; limits ±.0005″

CAST IRON END PLATES

30 pieces (60 surfaces) per hour; ⅛″ stock removed each side; limits ± .002″

ADJUSTING SCREW WASHERS

Low carbon steel; 200 pieces (200 surfaces) per hour; .025″ stock removed; limits ± .001″

HOT ROLLED STEEL CAMS

225 pieces (450 surfaces) per hour; 1/32″ stock removed each side; limits ± .001″

NOW! BLANCHARD PRESENTS ANOTHER GREAT NEW GRINDER

with Automatic Cycle Control

This great new Blanchard Surface Grinder performs a variety of jobs with speed, ease and accuracy.

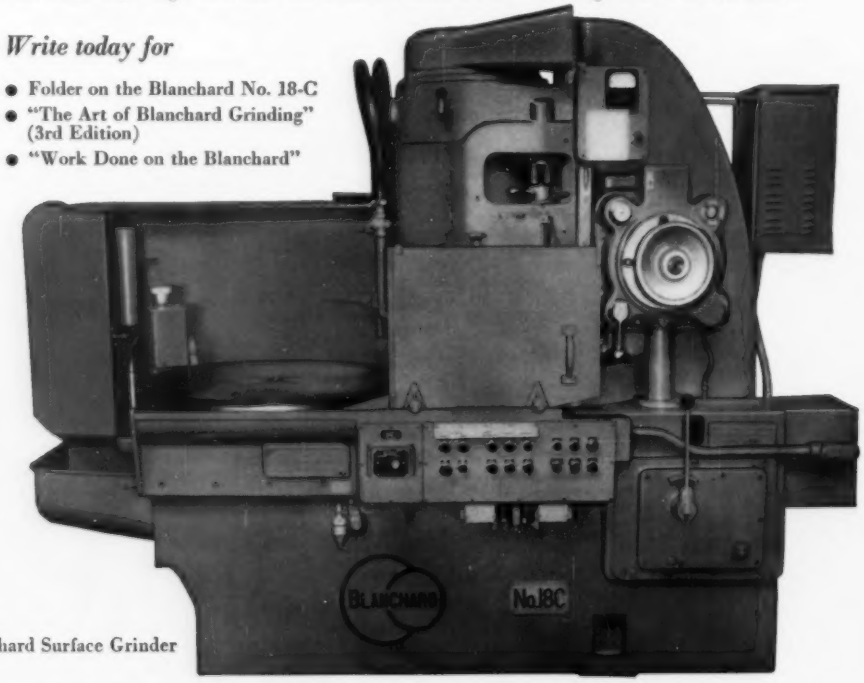
One operator can easily operate two of these No. 18-C grinders under balanced conditions. By using the automatic cycle, he can unload, clean and reload one grinder while the other is grinding.

Here's what the automatic cycle does: moves chuck (30″ or 36″ dia.) to grinding position and starts it rotating; starts wheel rotation and coolant pump; provides rapid wheel approach to work; engages power down-feed at preset rate; changes to fine feed just before finished size is reached; stops feed when work is to size – "sparks" out; raises wheel head; stops wheel, coolant pump and chuck; moves chuck to loading position – demagnetizes chuck.

This new Blanchard also features: push button selection of manual or cycle operation; size control; simplified feed and head traverse controls; adjustable dwell timer.

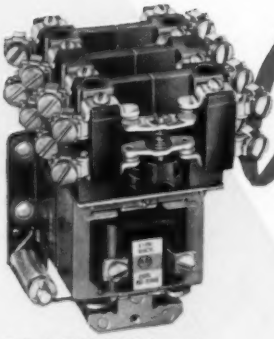
Write today for

- Folder on the Blanchard No. 18-C
- "The Art of Blanchard Grinding" (3rd Edition)
- "Work Done on the Blanchard"



No. 18-C Blanchard Surface Grinder

THE BLANCHARD MACHINE COMPANY 64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.

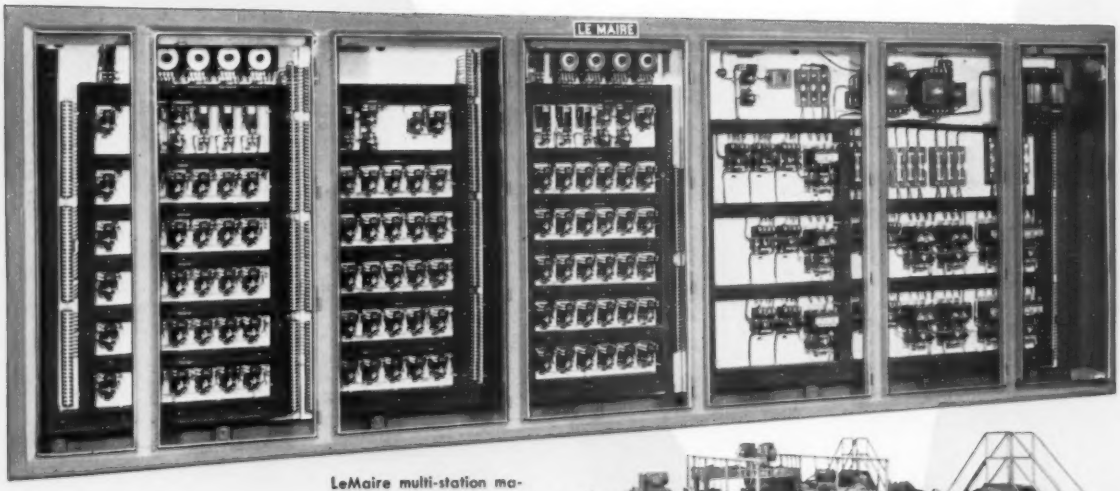


Bulletin 700 BX Universal relay with 4 normally open & normally closed contacts.

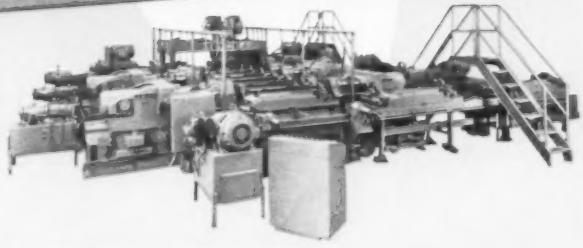
OVER 125 ALLEN-BRADLEY

RELAYS, TIMERS and STARTERS

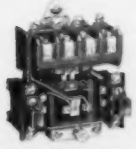
in this LEMAIRE Multiple Station Machine Panel



LeMaire multi-station machine operated by panelboard shown above. A good example of Allen-Bradley solenoid controls in the automotive industry.



Bulletin 709 Size 3 starter. Rated 30 hp, 220 v; 50 hp, 440-550 v.



Bulletin 709 Size 1 starter. Rated 5 hp, 220 v; 7½ hp, 440-550 v.

Bulletin 702 3-pole relay with magnetic hold-in latch. A hum-free relay.

Did you notice the prominence of Allen-Bradley solenoid motor controls at the recent Chicago Machine Tool Show? Manufacturers recognize these reasons . . . the long, trouble free life of Allen-Bradley motor controls . . . their unerring precision in operation . . . the inherent QUALITY of their workmanship and materials.

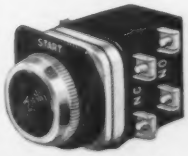
Machinery manufacturers look to Allen-Bradley as a reliable source of control units and components. The A-B trademark is to them and their customers The Sign of QUALITY in Motor Controls.

Send for the Allen-Bradley Handy Catalog. It is a recognized handbook on motor control. Or, let our control specialists help you with your control problems.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

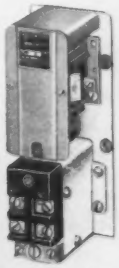
A-B Quality

ALLEN-BRADLEY
QUALITY
TROUBLE FREE
MOTOR CONTROL



Bulletin 800T oiltight push button with NO & NC contacts.

Bulletin 802T adjustable lever limit switch.

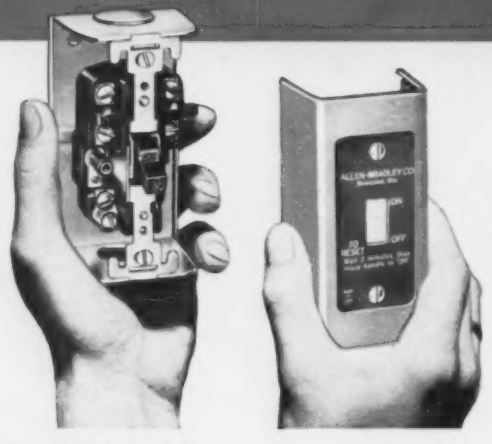


Bulletin 849 pneumatic timer—adjustable from 1/10 to 180 sec.

2-56-R

SMALL MOTORS
need overload protection too!

BULLETIN 600 STARTING SWITCH



Because

SMALL MOTORS CAN BE AS IMPORTANT TO PRODUCTION SCHEDULES AS LARGE MOTORS

Here is an outstandingly popular starter for applications using motors of ONE HORSEPOWER OR LESS.

It is a small, manually operated starter that is equipped with a time-tested, reliable A-B overload breaker. A soldered ratchet trips the operating lever in case of a sustained overload. It is reset, after tripping, merely by moving the operating lever to the OFF position. Overload heater elements are available to cover the ratings of this starter.

The Bulletin 600 starting switch is available in single and double pole construction. Its double break, silver alloy contacts provide high interrupting capacity. The contacts are always in good operating condition. They never need to be cleaned, filed or dressed. Please write for a copy of Bulletin 600 for complete information on the Bulletin 600 line.

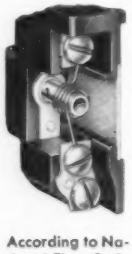
SIMPLE DESIGN

Simple ON & OFF snap switch . . . easy access to terminals . . . ample wiring space . . . silver alloy contacts need no cleaning or maintenance.

ATTRACTIVE APPEARANCE

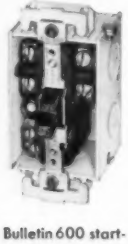
Streamlined enclosure in grey enamel, and bonderized to assure positive binding of enamel finish to resist corrosion. The pilot light is optional.

OVERLOAD BREAKER



According to National Elec. Code ruling, motors of 1 hp or less, automatically started by thermostat, float switch, etc. must have overload protection.

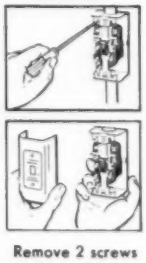
FITS STANDARD SWITCH BOXES



Bulletin 600 starters fit any standard 2½ in. deep wall switch box.

Can be mounted in machine frame or base. Available with pilot light.

EASY TO INSTALL

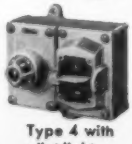


Remove 2 screws on front of starter . . . slip off cover . . . attach conduit . . . pull in wires and connect to terminals . . . replace the cover.

VARIETY OF ENCLOSURES

Type 7 for hazardous locations.

Type 4 watertight.



Type 4 with pilot light.

Allen-Bradley Co.
1316 S. Second St.
Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

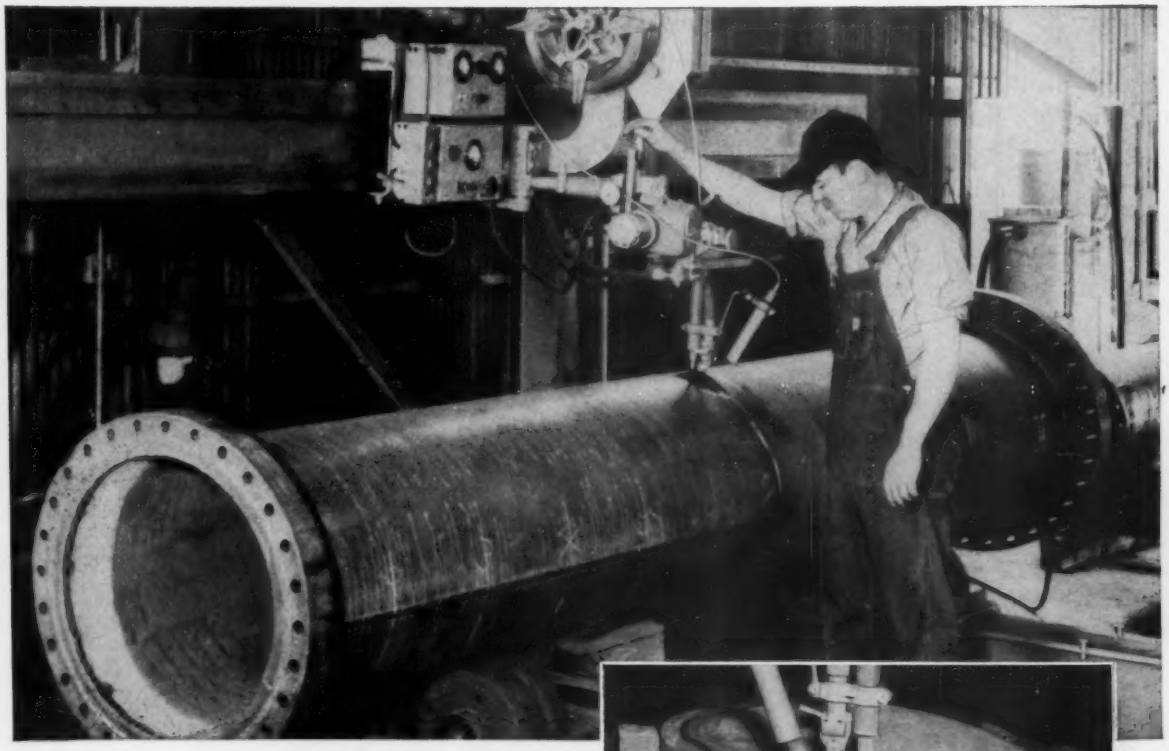
A-B Quality

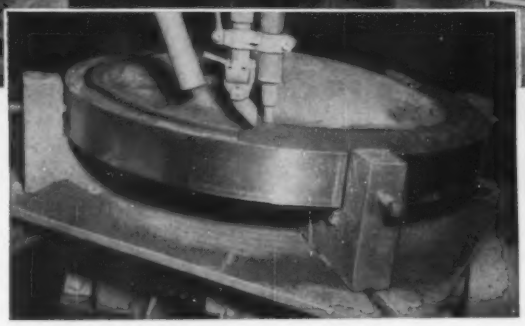
ALLEN-BRADLEY

BULLETIN 600 STARTING SWITCHES

QUALITY

2-56-MP





X-RAY-QUALITY WELDS ...75% FASTER *with* UNIONMELT WELDING

Top-quality welds are a must to assure the maximum service life of parts subject to high pressure and temperature. Like many manufacturers of pressure units, the Western Supply Company, Tulsa, Oklahoma is using UNIONMELT welding to make X-ray-quality welds (in heat exchanger shells) at new high speeds.

*** HIGH SPEED:**

UNIONMELT welding speeds average 15 to 19 in. per min.—this is as much as 75 per cent faster than welding methods previously used. The steel parts welded range from ½ to 3 in. in thickness, and welds are made in from one to three passes.

*** REDUCES GRINDING:**

Since UNIONMELT welding produces smooth, flat weld beads, the need for grinding completed welds has practically been eliminated—further reducing production costs.

UNIONMELT welding is the fast, efficient method of fabricating metals thicker than 18 gage. UNIONMELT welding makes possible increased fabricating speeds and lower production costs. Learn the details—call your local LINDE Representative for more information on UNIONMELT welding, and start saving today.

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30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

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Linde Trade-Mark

Maytag switches to STANICOOL HD *Soluble Oil... makes two-way saving*

1 *Cost of soluble oil reduced*

2 *Soluble oil consumption cut two-thirds*

A 300 ton Verson press at the Maytag plant, Newton, Iowa, is used for piercing holes in the inner tubs of Maytag's fine automatic washers. Material used is 18 gauge enameling iron. Holes are pierced in six automatic cycles. A total of 936—$\frac{3}{16}$ inch holes and 6—$1\frac{9}{32}$ inch holes are incised in each tub.

A check of manufacturing costs on the tubs disclosed that the cost of soluble oil per unit produced was too high. Standard Oil lubrication specialist J. I. Nelson, working with plant management, suggested a switch to STANICOOL HD Soluble Oil. The switch was made and Maytag received the first part of its two-way saving: the cost of soluble oil per gallon was reduced. Then it was found that the same high quality product could be turned out, without loss of tool life, while spraying only every third tub. Formerly *each* tub was sprayed with soluble oil before punching. With STANICOOL HD, Soluble Oil consumption was reduced two-thirds. And thus, Maytag received part two of its two-way saving.

Perhaps STANICOOL HD Soluble Oil can help you make similar savings. Find out more about this quality soluble oil. Call your nearby Standard Oil office. There is one near you in any of the Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Maytag, leader in cutting laundry time for modern homemakers, knows how to cut manufacturing costs, uses STANICOOL HD.

Dwight Norton (right), a Maytag plant foreman, inspects automatic washer inner tub with Jesse I. Nelson, Standard Oil lubrication specialist. Jesse Nelson is well qualified to provide lubrication technical service. He has a B. S. degree in engineering from the University of Iowa and has completed the Standard Oil Sales Engineering School. Jesse has been helping customers with lubrication problems for more than three years. Customers find his experience and training pay off *for them*.

Quick facts about STANICOOL HD Soluble Oil

- Emulsifies readily with all waters.
- Forms stable, uniform emulsion.
- Does not turn rancid.
- Non-injurious to men, machines and work.
- Economical. Meets work requirements with relatively low emulsion concentrations.
- Prevents rusting of work and machines.
- Gives better tool life.
- Doesn't form gum on machines.

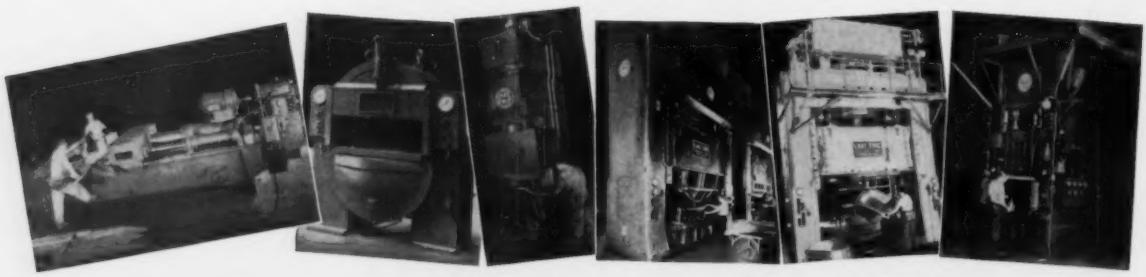
STANDARD

STANDARD OIL COMPANY
(Indiana)

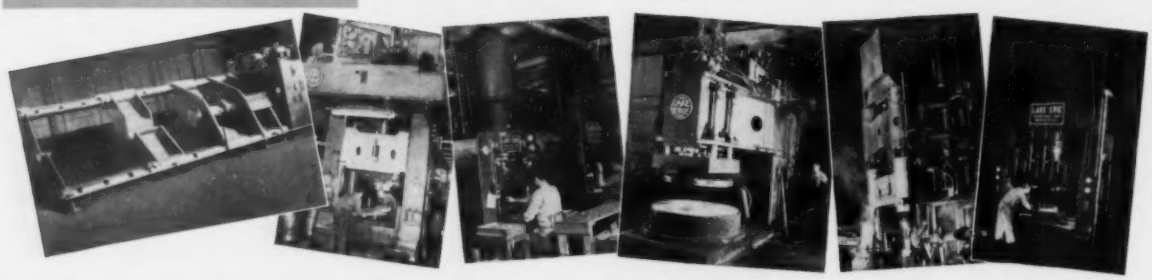
What we did for OTHERS

We have developed more than 3,500 *different designs* of hydraulic presses of *all types* to cut costs, simplify manufacture, improve quality and increase production for others.

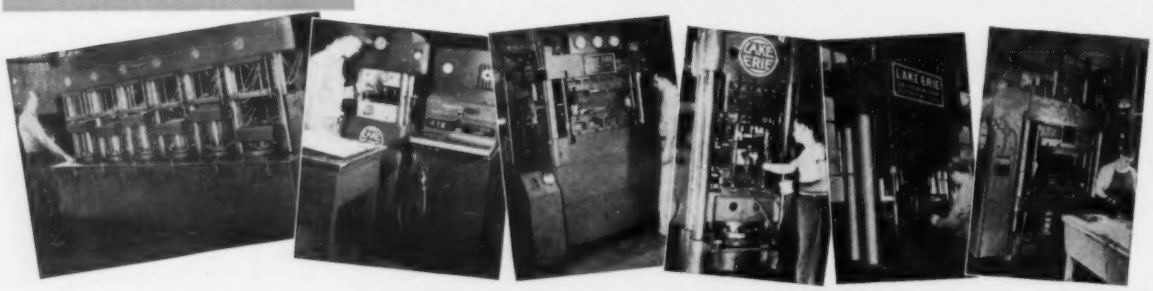
FORMING • EMBOSSING • COINING



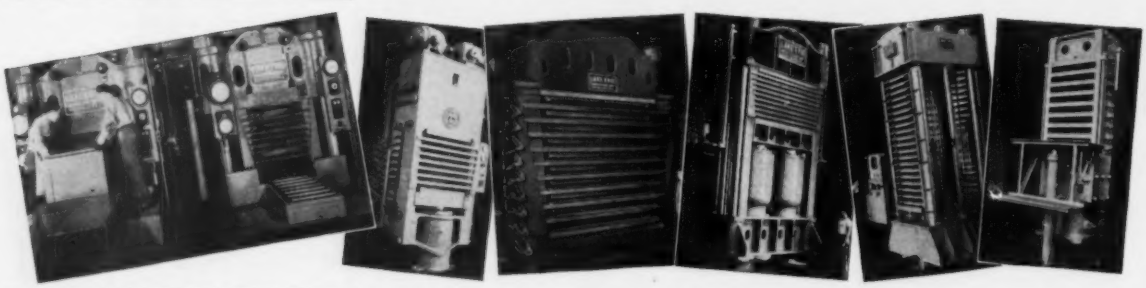
METAL WORKING — DRAWING • BENDING • FORCING



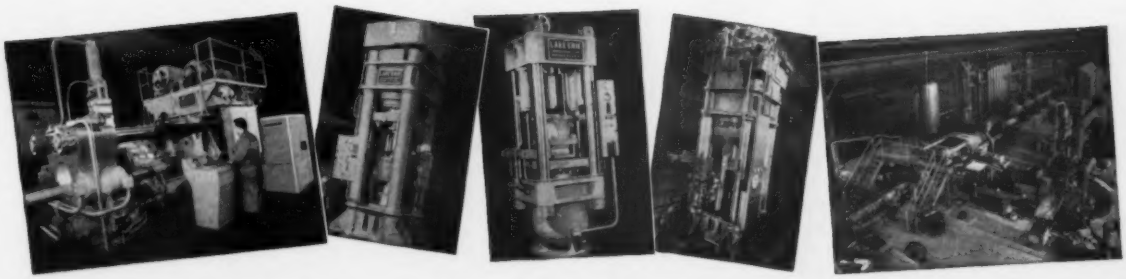
METAL WORKING — FORGING • HOBBING • FLANGING



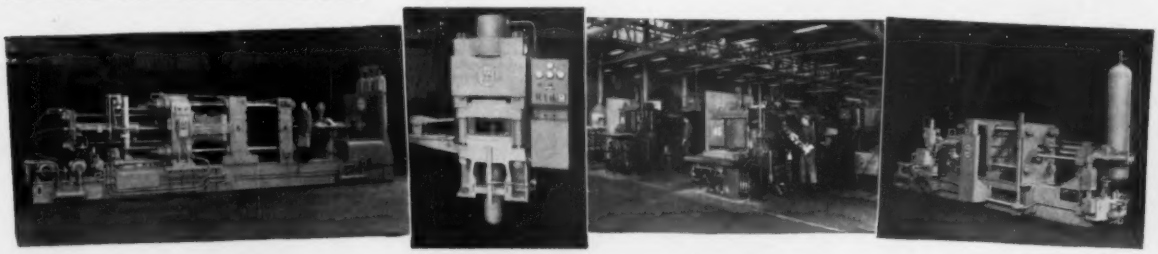
PLASTIC MOLDING — COMPRESSION • TRANSFER • LABORATORY



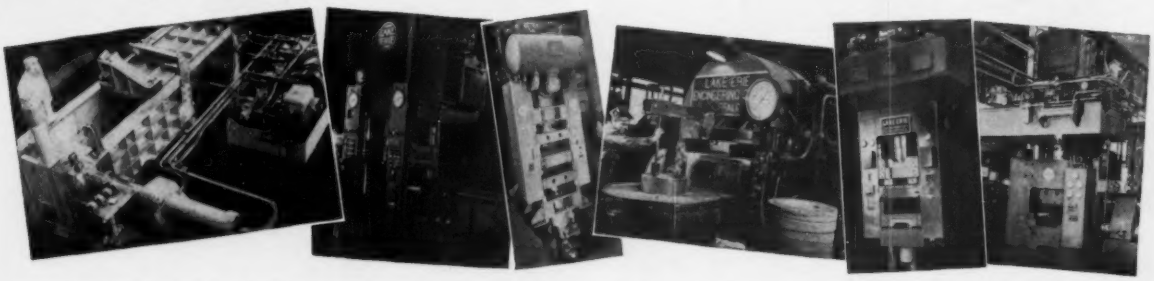
WOOD & PLASTIC PANELS — HARDBOARD • WALLBOARD • PLYWOOD • LAMINATES



EXTRUSION PRESSES LEAD • CARBON • NON-FERROUS METAL



DIE CASTING HOT CHAMBER • COLD CHAMBER • VERTICAL



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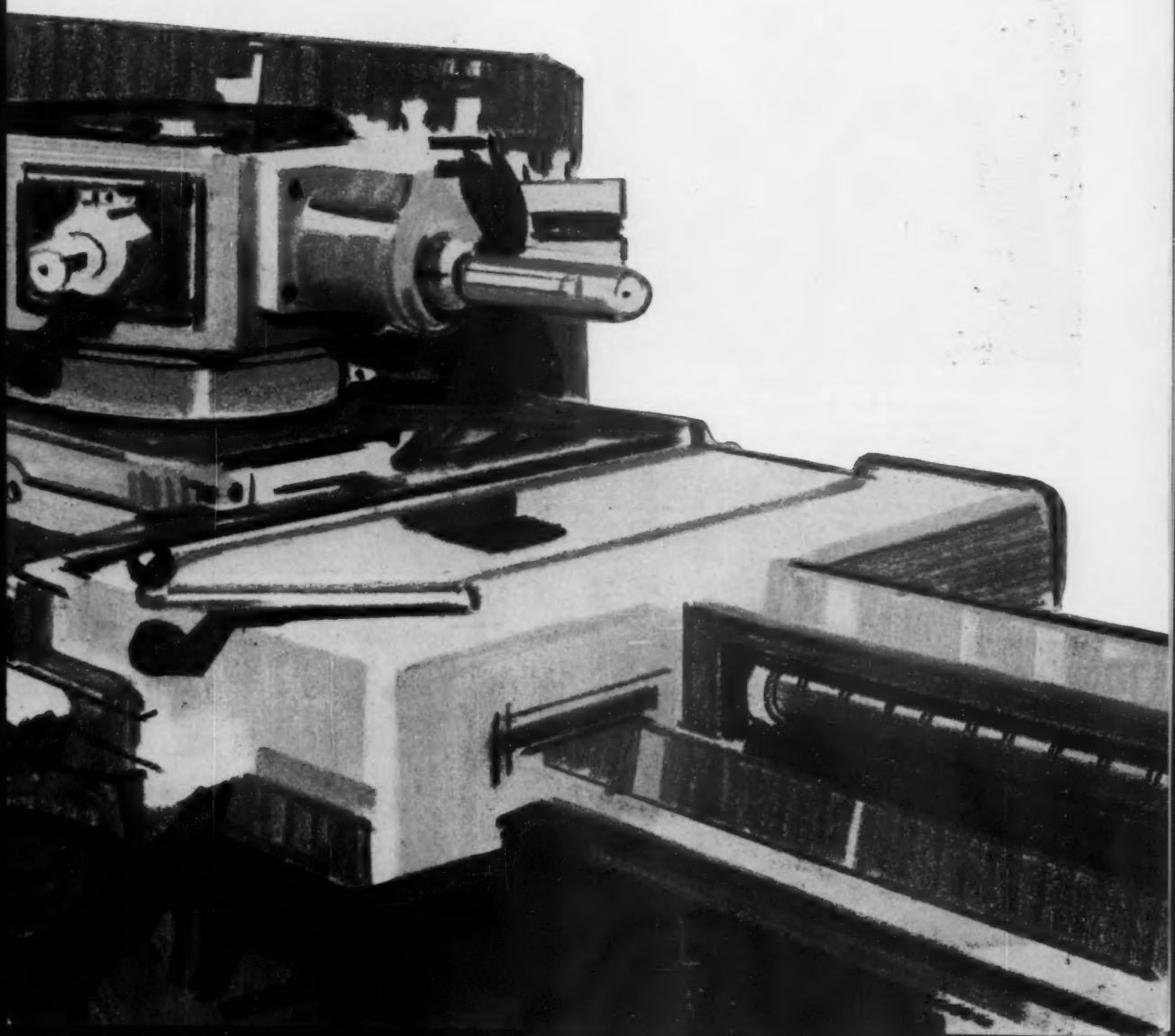
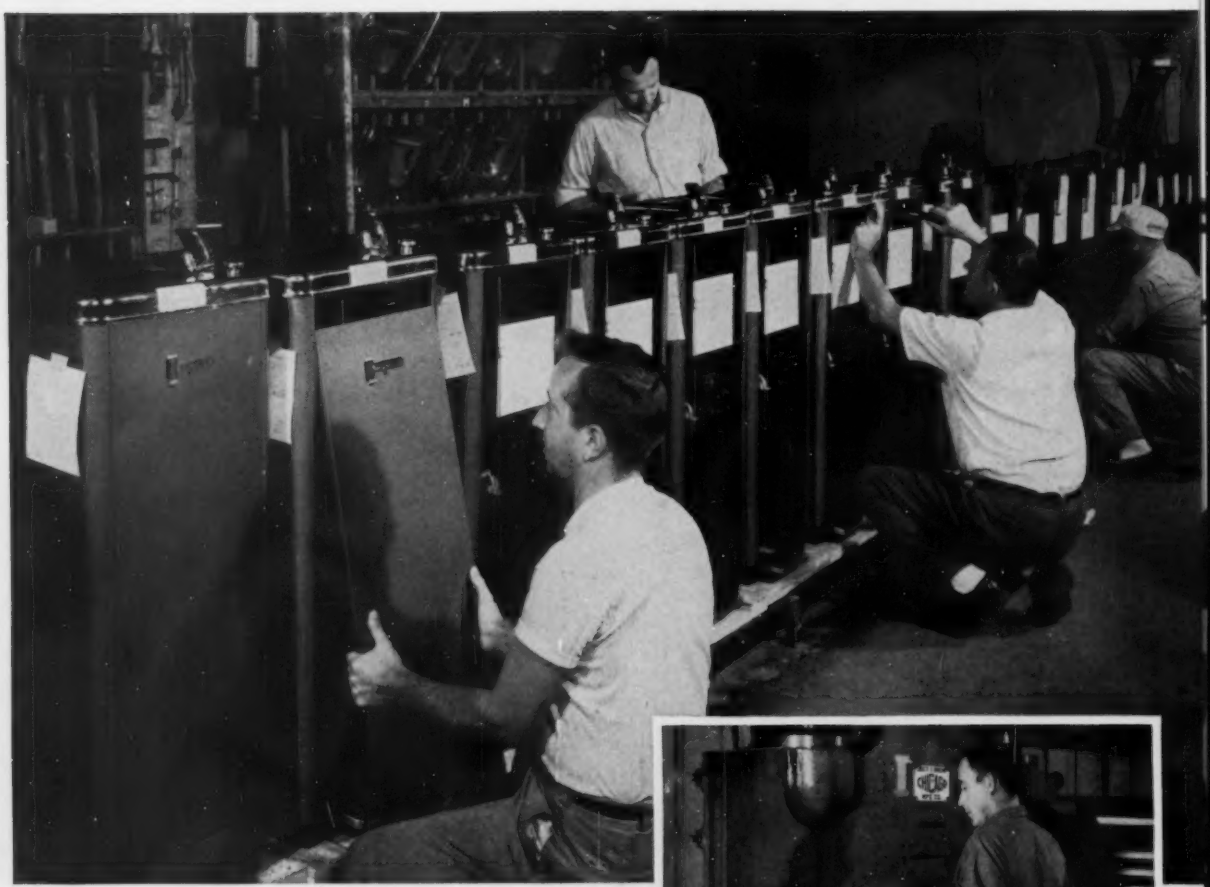
Look ahead—keep ahead—with Gisholt



Republic Electro Paintlok® doubles



ONLY ONE COAT OF PAINT on Republic Electro Paintlok, results in a handsome, durable finish for these Temprite water coolers. In addition, Republic ENDURO® Stainless Steel is used for fountain tops to provide life-time beauty and sanitation.

SEVERE FORMING AND BENDING are shrugged off by chemically treated, electro plated zinc surface of Electro Paintlok. In fact, the phosphate coating itself acts as a lubricant for certain forming operations. Send coupon for full details.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

production of existing facilities

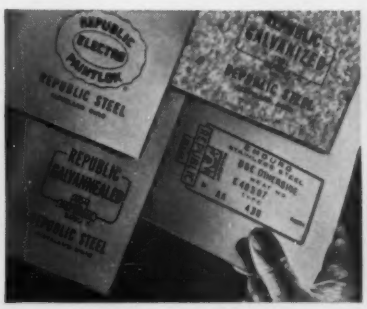
By using Republic Electro Paintlok instead of cold rolled sheet steel for their water cooler housings, Temprite Products Corporation of Birmingham, Michigan, actually double the output of their painting and drying facilities. How? Because only one coat of paint is used on these parts when fabricated from Electro Paintlok, and one pass through the drying oven is sufficient to produce a high-quality, long-lasting finish.

In contrast with this, uncoated sheets for this application required a prime coat before final painting. Temprite found, through experience, that the labor and material cost of the primer coat exceeded the extra cost of Electro Paintlok. Even more important, at today's level of demand *they could not maintain required volume of production when both a primer and final coat of paint had to be applied and dried.*

As a result, Temprite has standardized on Republic Electro Paintlok. And in addition to cost and time savings, they secure a higher quality finish as well. Even when scratched through, Electro Paintlok's chemically treated zinc surface continues to retard corrosion and effectively limits it to the point of original damage.

Add all of these advantages to the fact that Electro Paintlok is delivered from the mill in prime condition for painting and will not rust under approved warehousing conditions . . . and you can see why it will pay you to investigate its use wherever you have a paint adherence problem. Simply contact your Republic representative or mail the coupon for full information.

BUILT-IN SALES APPEAL for the Temprite Club Bar, four-beverage dispenser, is secured through the use of ENDURO Stainless Steel for all housing components. The lustrous beauty of ENDURO harmonizes with any surroundings . . . stays bright and sanitary indefinitely without laborious polishing. Republic makes all analyses of stainless to meet every application. Coupon will bring full information by return mail.



PRODUCTION PROBLEMS VANISH when you specify Republic Steel Sheets. Whatever your requirements, your Republic representative or steel distributor can help you select the ideal type of sheet. He is backed by a broad selection including hot rolled, cold rolled, galvanized, Galvannealed, Electro Paintlok, Electro Zincbond®, Electro Flashcote and other types in a wide variety of analyses.

END PRODUCTION BOTTLENECKS by sending your sheet steel fabricating problems to Republic's Berger Division. You get the benefit of complete contract fabricating facilities, plus a wealth of experience, designed to form high-quality sheet steel into products or components of your own design, economically. Investigate this means of cutting tooling costs and plant additions. Mail the coupon for further data, today.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
3104 East 45th Street, Cleveland 27, Ohio

Please send me further information on:

- ☐ Republic Electro Paintlok
- ☐ Republic ENDURO Stainless Steel
- ☐ Berger Division Contract Manufacturing Facilities
- ☐ Republic Sheet Steel (specify)_____

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

C-1284

H-VW-M *Generators not only meet standards -they make 'em!*

Yes, today's performance standards are higher than ever for motor generator sets. And the final examinations that *all* H-VW-M low voltage motor generators must pass before delivery have consistently raised industry standards for voltage regulation, power factor correction, overload capacity, and exceptionally long and efficient life for all parts. It's a painstaking, exacting process, but the net result is a line of generators that can't be beat.

Manufacturing top-quality generators is only one of many results of over eighty years of constant electroplating development—a continuing policy summed up in H-VW-M Platemanship...your working guarantee of the best that industry has to offer—not only in plating—current generators—but in every phase of plating and polishing.

8541

For full information on all H-VW-M Low-Voltage Generators, ask for Bulletin G-102.

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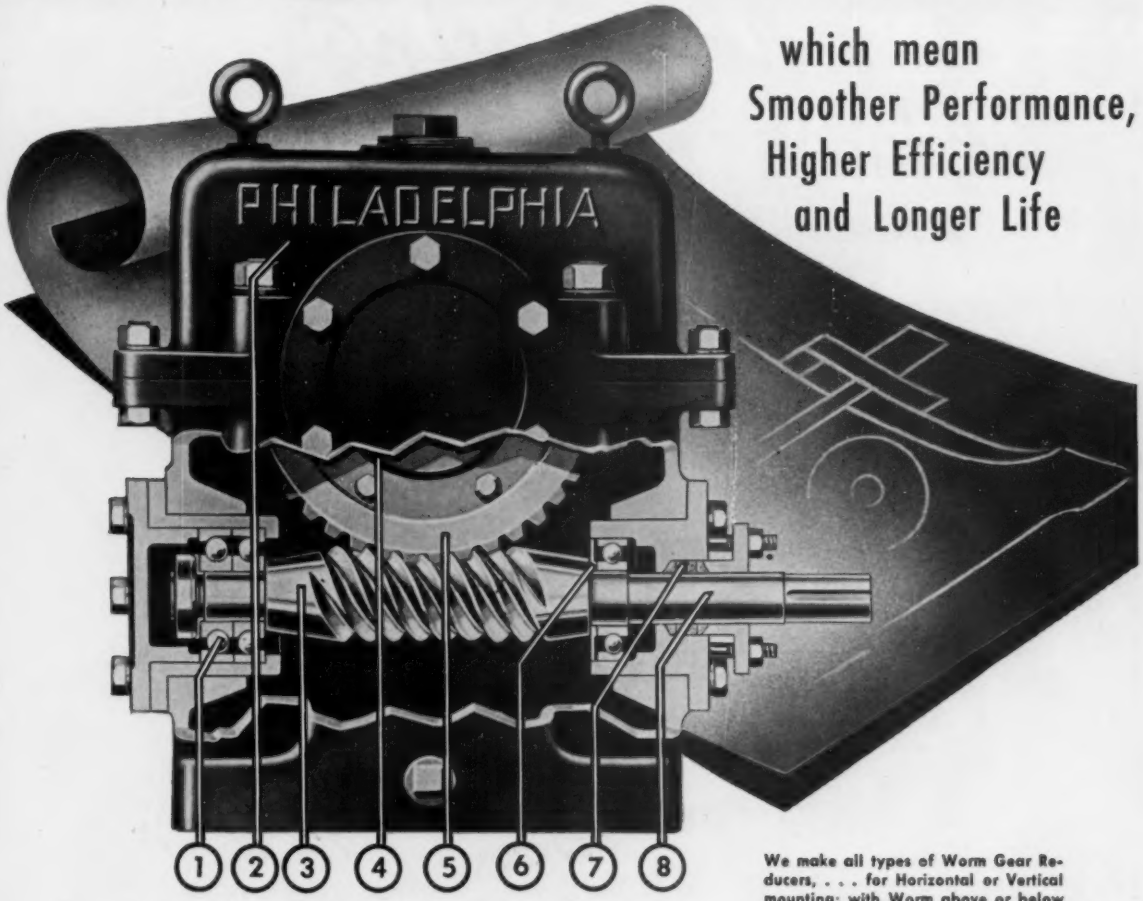

1____ **BEARINGS** throughout are of highest quality, calculated to take all loads and stresses in accordance with maximum ratings of units.

2_____ **EXCEPTIONALLY RIGID HOUSING** of best grade cast iron . . . Strengthening ribs integral with design.

3_____ **WORMS** made of SAE 3115 Steel with carburized and hardened threads. Shaft and threads smoothly ground after hardening.

4_____ **GEAR SHAFT BEARINGS** run in an oil well that automatically fills with fresh oil when filled from top. Splash from the gear keeps the wells filled to the overflow point.

5_____ **WORM GEAR** made from quality chill cast nickel bronze bolted to a semi-steel center. (Smaller sizes are solid bronze.)

6_____ **WORM AND WORM BEARINGS** run in oil bath. Baffle plates prevent flooding.

7_____ **WORM SHAFT** equipped with stuffing box to prevent oil leakage.

8_____ **SHAFTS** are premium quality. Always accurate, straight, concentric.

We make all types of Worm Gear Reducers, . . . for Horizontal or Vertical mounting; with Worm above or below Worm Gear; in Single, Double or Triple Reductions for medium or heavy duty service; any horsepower or reduction ratio.

Tell us your Speed Reduction problems, and a Philadelphia Sales Engineer will gladly call upon you, . . . without obligation.

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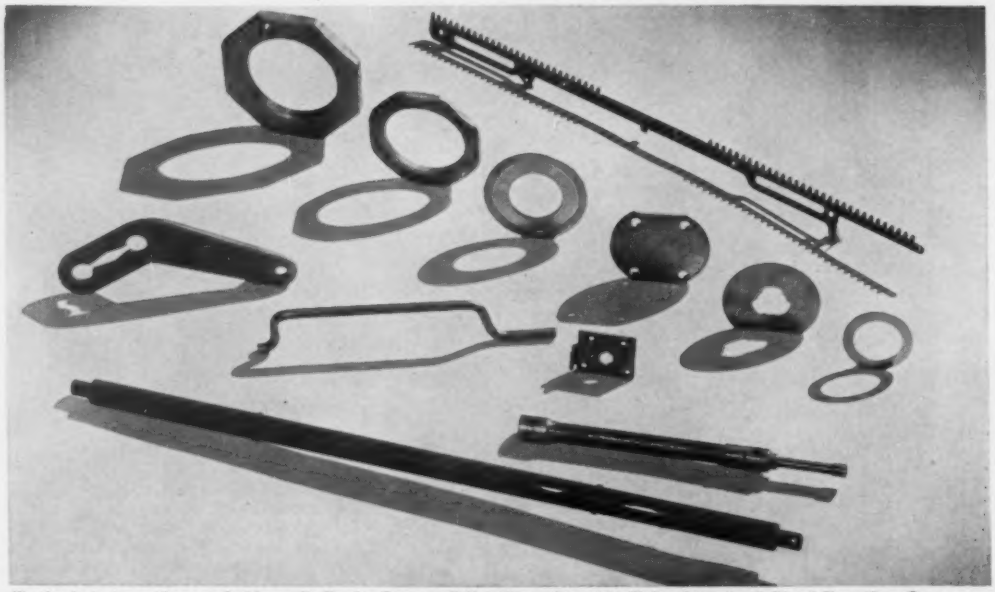
DRY CYANIDING

PROCESS



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5. **It is an *ECONOMICAL* case hardening process.**

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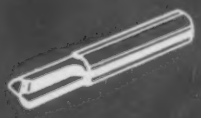
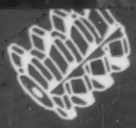
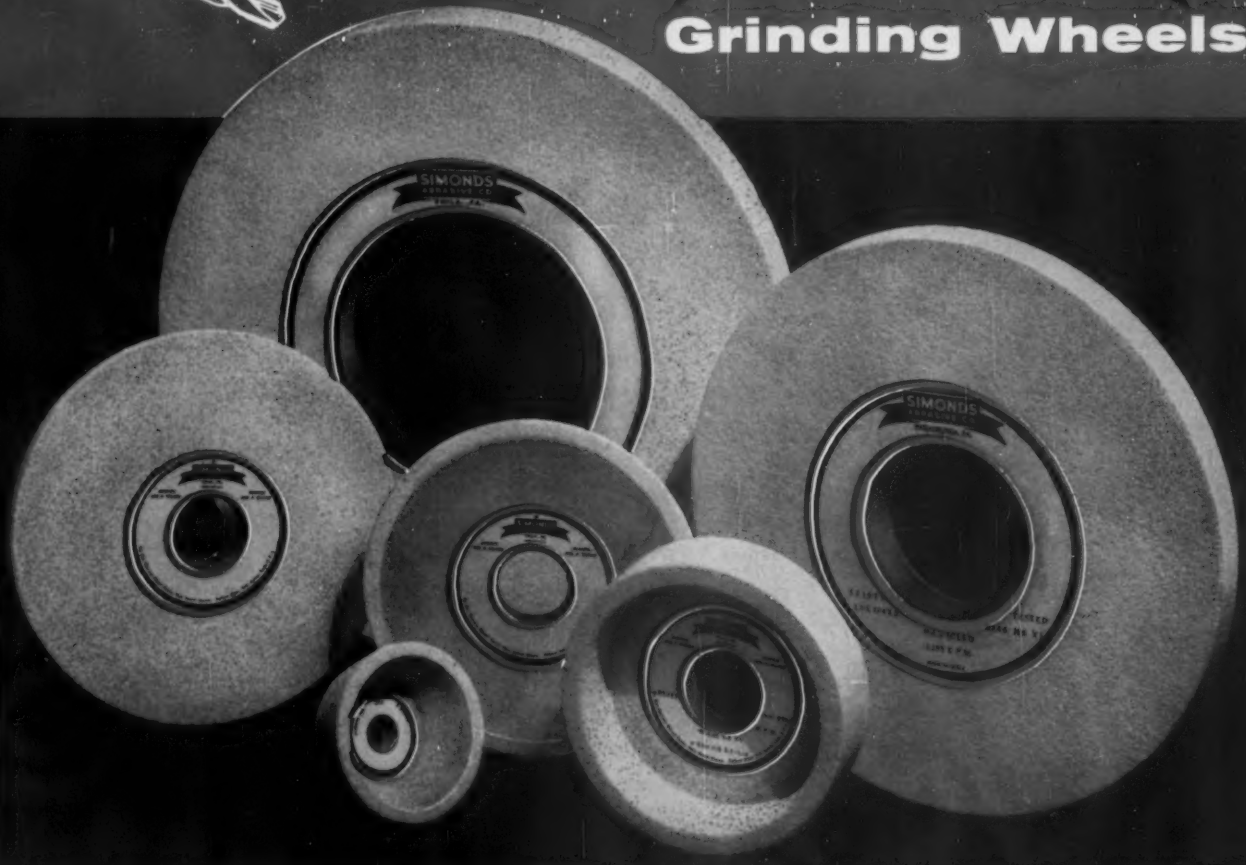



Get the BEST in tool and cutter performance with SIMONDS ABRASIVE CO.

Grinding Wheels



W Borolon® White Wheels

TRADE MARK

For hardened and high speed steels, high carbon, high chrome and other alloys. For fast, cool cutting action with long wheel life, these wheels belong on *your* toolroom grinders. Made with W Borolon (special aluminum oxide abrasive) for fast stock removal and the finish you want without burning expensive steels. Engineered for true concentricity and good balance. Furnished in protective plastic bags. For consistently superior results, standardize on Simonds W Borolon White Wheels.

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LOCAL STOCK
FAST SERVICE

Here's how you can help make stainless plate stocks go a LONG way...

Whenever demand outdistances supply you have problems. But any problem can be solved when all hands cooperate. If you keep in mind these "rules of the road" you will be able to add extra mileage to the supply . . .

1. If you have a D.O. rating, give it to your supplier—it helps him get the necessary nickel, and protects your position on his schedule.
2. If you are going to cut plate into smaller pieces, give your supplier the option of furnishing small pieces.
3. Plan ahead as much as possible, so your supplier has a reasonable chance to meet your delivery requirements.
4. If an alternate analysis or a slight variation in gage is acceptable, let your supplier know.
5. Buy "cut-to-shape" pieces and reduce your time and costs of handling scrap.
6. Clean out your stainless scrap so that it can get back into production.
7. Order only what you need in stainless plate—to exact size.

Put these simple rules to work . . . it will help you, and all of us, stretch the supply to the limit.

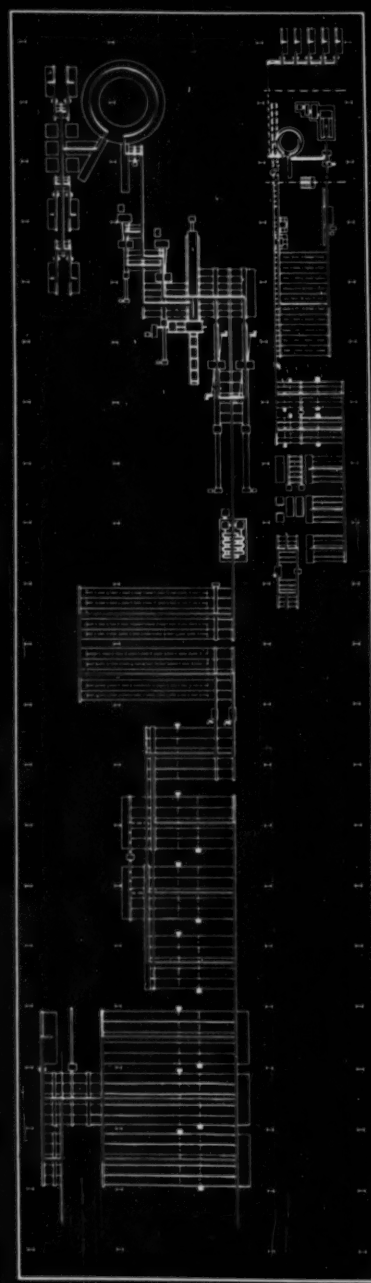
Stainless Steels Exclusively

G. O. CARLSON, INC.

Plate • Plate Products • Forgings • Bars • Sheets (No. 1 Finish)

THORNDALE, PENNSYLVANIA

District Sales Offices in Principal Cities



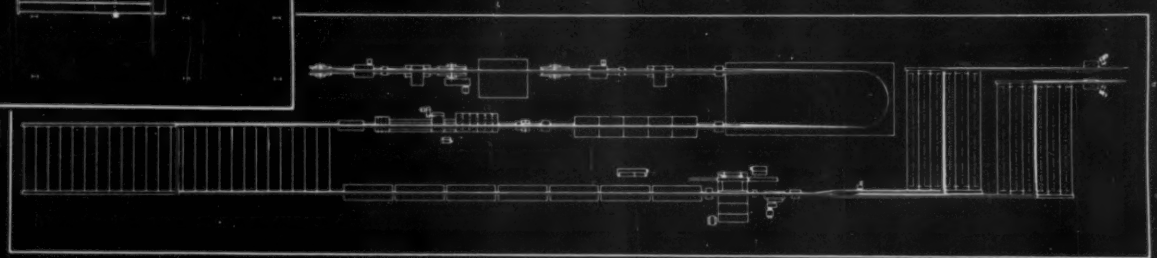
Is there a standard way to build a tube mill?

Not according to what we've learned in many years of building and equipping tube and pipe mills.
Mannesmann-Meer's NO to this question is dictated by two factors – the individual needs of our various customers and the steady progress we build into our equipment.
Here is an example. Economic needs and often other considerations lead many Companies into installing a new mill step-by-step. This procedure sometimes has marked advantages which show up in the mill layout and in the integrated planning for future steps of expansion, all of which will then be up-to-date. On the other hand mills for certain tubular products which must be installed all at once present different problems in plant engineering – with different solutions.
Meeting your individual needs and requirements is second nature for us.
Nowhere else in the world is Mannesmann-Meer's combination of

- CREATIVE ENGINEERING
- DESIGN EXPERIENCE
- OPERATING BACKGROUND
- AMERICAN MANUFACTURING SKILL

available and ready to go to work on your tube and pipe mill problems.

Mannesmann-Meer Engineering and Construction Company, Inc.,
900 Line Street, Easton, Pennsylvania



MANNESMANN-MEER

World Specialists in High-Speed Tube Mill Machinery

Ever feel as though you're being GANGED BY GHOSTS?

Ever feel . . . when you place an order over the phone . . . that you're all set with the man you're talking to? Then, next time you call he has vanished into thin air . . . and you're talking to someone else, telling him the same old story all over again. And then *he* vanishes, too. And then . . .

Well, this doesn't happen to any Bristol Brass customer. The first man you talk to is the *only* man you talk to. He takes you straight through from order to delivery, and stays with you all the way. He doesn't have to be a vice president. Whoever he is, he has the authority . . . and the mill experience . . . and the sales experience, too . . . to know how to get your order right on the main line right now, whether it's strip, rod, or wire. That's what we mean by Bristol Fashion . . . everything shipshape and promptly delivered.

THE BRISTOL BRASS CORPORATION

has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton.

"Bristol-Fashion" means **Brass at its Best**

MELTING FORGING HEAT TREATING MACHINING

"THE WHOLE BALL OF WAX"

Complete Steel Forging Facilities from Melt to Finished Product for Heavy Press Forgings of Intricate Shape . . . . . Write

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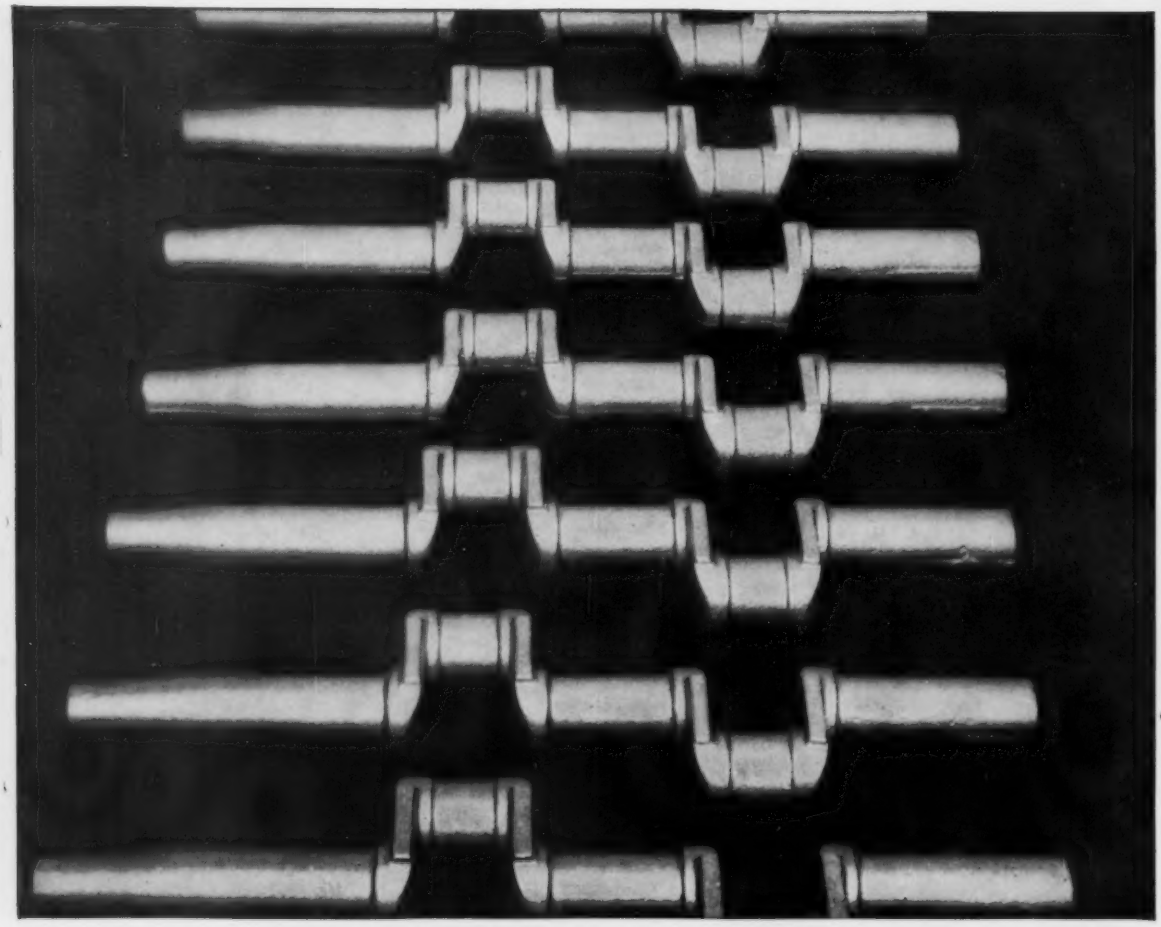
IRON WORKS, Inc.

SPECIAL PRODUCTS DEPARTMENT
P. O. Box 1212, Houston, Texas



Ductile Cast Iron meets a variety of demands. These crankshafts utilize the 80-60-03 type, with the following typical range of properties: Tensile strength 90/110,000 psi, yield strength 60/75,000 psi, elongation 3/10%, hardness 200/270 BHN. Strong as-cast, tough and easily machinable. Also responds readily to flame or induction hardening. A carbidic, abrasion-resisting surface may be obtained by casting it against a chill.

Costs cut 70%... time cut 50% by switch to Ductile Cast Iron

OTACO LIMITED, makers of farm machinery at Orillia, Ontario, formerly used crankshafts of forged mild alloy steel for 2-cylinder gasoline engines.

By switching to crankshafts cast in Ductile Iron, this manufacturer cut down some 11 machining and heat-treating operations to a total of only 5 machine operations.

As a result, completed crankshafts went into assemblies at roughly 30% of the original dollars and cents cost. And production time . . . raw material to assembly point . . . decreased almost 50%.

Savings, along with greatly improved performance, are provided by Ductile Cast Iron. Because it can be cast easily, like cast iron . . . yet it provides strength and toughness comparable to that of cast steel, and offers superior wear-resistance.

Perhaps you, too, can save money with this new engineering material. It's several times stronger than gray cast iron and up to 12 times tougher. Get the facts about this *greatest foundry advance in over a century*. Send for the new INCO booklet, "DUCTILE IRON, The Cast Iron THAT CAN BE BENT." Write for it now.

DUCTILE D IRON

ductile iron . . . the cast iron that can be twisted and bent

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street New York 5, N.Y.

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SuVeneer clad metal

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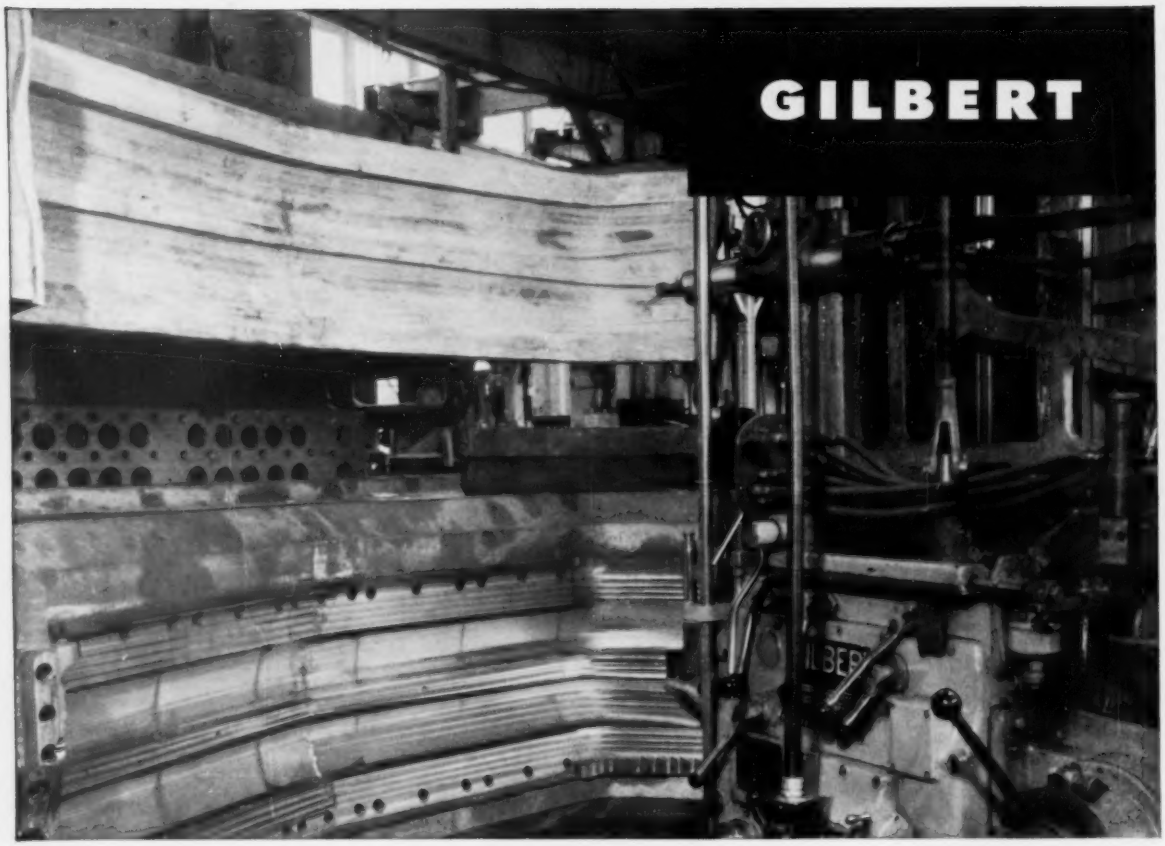
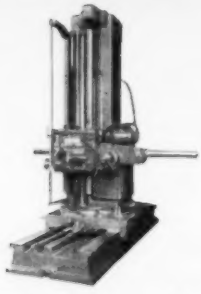
it's available!

We wed copper to steel for greater strength . . . stainless to carbon steel for better heat conductivity, easier workability. Enjoy product improvement and conserve scarce materials with SuVeneer. Write us!

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA



add reverse curves to your machining pitch



"The Gilbert revolving column boring mills, together with the very accurate Goodrich follower, make possible the machining of deep cavity, steep side dies complete in one position of the work piece.

"It is also possible to machine cupped ends or reverse curves without having to move the job."

These are the words of Mr. Ed Miller, President of the Lansing Tool & Die Company, Lansing, Mich. With his two Cincinnati Gilbert Floor Type boring mills, he has offered customers machining services which couldn't be done on any other horizontal mills. Other equipment capable of doing these jobs costs several times more than the Gilberts.

For profiling and duplicating, a Gilbert offers you quick profits on a low investment. Bulletin 954 contains full descriptions and specifications. Write for it today. *The Cincinnati Gilbert Machine Tool Co., 3366 Beekman St., Cincinnati 23, Ohio.*

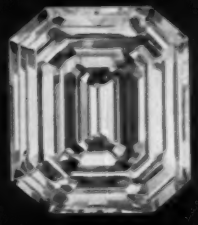
You can buy a new Gilbert floor type horizontal boring mill with 60" vertical and 72" horizontal travel on a 5-year payment plan for as little as $4040 down and $303.50 a month. This is 91c an hour on a two 8-hour-shift operation. Includes low 6% simple interest (3% add on).

those who buy Gilbert buy **GILBERT** *again*

Here is perfection!

ROEBLING high carbon wire is unsurpassed for industry today. Roebling wire is absolutely true to specifications ...absolutely uniform in gauge and finish. Manufacturers who try Roebling wire once, become Roebling customers from then on.

You *pay* for the best when you buy high carbon wire. Make sure that you *get* it! Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.



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what's new

IN STAINLESS STEEL FROM STOCK

Extra-Large Plates & Sheets— You can save on welding costs and improve the appearance of big fabricated pieces now that you can get stainless plates and sheets from Ryerson stocks in extra-large sizes. Types on hand: *Plates*—304, 304L, 315 and 316L in 96″ widths up to an inch thick, and 80″ widths even heavier. *Sheets*—304, size 72″ x 144″, in 10, 11, 12, 14 and 16 gauges.

Aircraft Steels Specs: Just off the press, a new booklet on aircraft quality stainless and alloy steel containing latest information on Aeronautical Specifications (Military (MILO, Air Force-Navy (AN), Federal (QQ-S) and AMS). Also included: a complete listing of aircraft quality stainless and alloy steels available for quick shipment from Ryerson. To get your copy, write your nearest Ryerson plant or Box 8000-A, Chicago 80, for Booklet 103.

Stainless Pipe for Welding Applications: Now there's no need to wait for mill deliveries or to use expensive stabilized types when you want stainless pipe suitable for welding. Type 304L pipe, an extra low carbon type that eliminates the need for stress relieving after welding, has recently been added to Ryerson stocks. Size range: Schedule 40 welded pipe in commonly used sizes from ¼″ through 2″. Schedule 40 seamless in 3″, 4″ and 6″ pipe sizes.

Save 7¼¢ Per Pound! For mild corrosion applications, type 430 straight-chrome stainless often serves quite as well as nickel-bearing types—and you save 7¼¢ per pound! Ryerson stocks include Type 430 sheets in many gauges and sizes. Technical data on request.

Easy-to-Weld Plates and Sheets, Too! Both stainless sheets and plates in Type 304L and Type 316L have recently been added to Ryerson stocks. In applications involving welding and stress relieving, where carbide precipitation may occur, these extra-low-carbon steels can often replace expensive stabilized types.

Save 30% on Ornamental Tubing! Recently added to Ryerson stocks, Type 302 ornamental stainless tubing is priced substantially below comparable stainless tubing for other than ornamental purposes. Yet it is more than satisfactory for many applications such as in restaurant and hospital equipment.

Joseph T. Ryerson & Son, Inc.

EVERY TYPE, SHAPE AND SIZE

Whether you need a single piece of stainless or a truckload draw on Ryerson stocks of more than 2200 sizes, shapes, types and finishes.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel... bars, structurals, plates, sheets, tubing, reinforcing bars, machinery & tools, etc.

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NEWSFRONT

Old Theory Fades Away

An important metallurgical landmark is being primed for quick burial. It is the long-prevailing theory that the ideal carbon content for a carburized case must always approximate 0.85 pct. Recent tests set optimum carbon from 15 to 25 points higher. They also claim that a higher carbon content, even at the same hardness level, wears better.

Look For A New Cure

One expected cure for the ever present valve eroding problem in process industries may be control of flow pressure rather than redesign of valves in highly critical areas. One method being considered is a variable speed pump joined electronically with the instrumentation controlling the entire flow.

Good Year In Prospect For Warehouses

The steel warehouse industry expects continued good business throughout 1956, limited principally by the steel supply from mills. Plates and structural shapes continue in tightest supply, and warehouse operators are not too optimistic over early relief. Stainless and nickel-bearing tool steels remain very tight due to the nickel shortage. The large machine tool order backlog makes the tool steel picture look good.

Another Angle On Car Safety

Newest automobile safety feature being developed by Ford Motor Co. engineers is a non-skid braking device. It'll automatically release braking action when a car goes into a skid, allowing the driver to keep it under control.

No Boom For British

British machine tool industry isn't booming as much as its U. S. counterpart. Expansion is hampered by: (1) domestic customers' preference, in many cases, for other European-made machines; (2) tougher competition for export business, especially from West German builders; (3) general shortage of skilled workers; and (4) lack of sufficient capital in small, privately-owned firms to finance new technical developments and manufacturing facilities.

Formula For Boosting Furnace Output

Further improvements in blast furnace output may be accomplished by mixing limestone with ore for sintering prior to charging into the furnace. Current efforts are considered experimental, but limestone mixing equipment is required as standard gear by purchasers on recent orders for sintering machines.

Cast 100-pct Usable Ingots

Ingots—100 pct sound and free of segregation —are now being cast by a new "horizontal casting" process. Developed in Italy, the process claims to produce a maximum of usable ingot metal at relatively low cost. Pouring one level at a time, metal is fed to ingot molds arranged horizontally like the spokes of a wheel and stacked one level above another.

Auto Supplier Feels No Pain

Slowdown in auto production has yet to be reflected in orders for car parts, according to one big contractor. While admitting some nervousness about the future and pointing out that there is usually a time lag between Detroit lags and order cuts, the company said that auto business continues at a brisk rate.

Foam Insulation Comes In Can

Foam insulation supplied in a paint can is promised by a new plastic coating material. Easily applied by dip or spray methods, the vinyl base material expands on moderate heating to 400 pct its original thickness. Used on air conditioning ducts, it provides heat insulation as well as acoustic deadening.

Another Use For Punched Cards

Expect announcement of equipment designed for automatic product inventory at the time it's made. Pilot installation in the metalworking field is scheduled for a Midwestern wire plant in February. As wire comes off the line, information on length, gage and other important factors is recorded on punched cards.

1/3 OFF

NO BARGAIN
FOR UNIFORM FLAT SPRING
PERFORMANCE

According to the deflection formula for flat springs, the deflection or load of flat springs will vary in direct proportion to the third power of the thickness.

This means that flat springs made from .010″ ordinary commercial flat rolled high carbon strip (standard gauge tolerance ± .001″) can be off as much as 33%, plus or minus, in deflection or load value.

Where the nature of the service calls for more uniform spring performance, CMP produces restricted thickness tolerances which make possible load tolerances of ± 10% or less. CMP is regularly supplying such uniform restricted tolerances for special flat spring applications, multiple-station progressive die forming and other specialized end products where uniform, extra-close gauge accuracy reduces fabricating costs and waste and provides better product performance.

If you have a flat spring problem, you are invited to avail yourself of CMP's specialized knowledge and experience in this field.

CMP
WHERE YOU CAN GET SPECIFIC SPECS. FOR SPECIFIC JOBS

LOW CARBON
HIGH CARBON
Annealed or Tempered
STAINLESS
ALLOY
ELECTRO ZINC COATED

PRECISION COLD ROLLED CMP STRIP STEEL

the Cold Metal Products co.
GENERAL OFFICES: YOUNGSTOWN 1, OHIO
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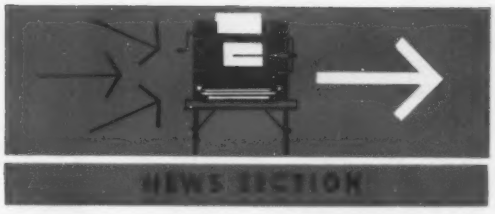


PROTECTION: It's A Serious Business

An alert plant protection force can save your company millions of dollars annually . . . Fire prevention and crime detection are only part of its job . . . Duties call for brains as well as brawn—By *D. G. Picinich.*

◆ IS YOUR plant protection force on its toes? It might be worth while to check into its efficiency. An alert guard force can save many times its actual cost to your company.

Here's how an executive of a large electrical equipment manufacturer puts it:

"In this installation, we have between $55 and $60 million worth of buildings and equipment. That's 2 million sq ft of property protected by a 25-man security force. We estimate that last year this force helped save around $3 million which might otherwise have been lost through incendiary and water leakage damage to buildings and equipment."

Says another:

"A weekend check by a security officer turned up a burst water pipe cascading tons of water to deserted offices and production areas below. Quick action by the guard in shutting off main control valves effected an estimated saving to the company of $5 million in what might have been irreparable damage."

An official at a plant with a 50-man security force has this to say:

"It's certainly conceivable that without these men we might well be out of business within 48 hours."

How To Do It

These case histories probably are typical of what goes on in hundreds of metalworking plants throughout the country. But they serve to point up that the job of a good plant security officer amounts to much more than guarding plant fences and routing potential thieves and vandals from company property.

"Aside from the usual duties of gate pass checking and time-clocking our plant area," says a leading manufacturing company, "our men know how and when to start up our generators and transformers so that they're warmed up and ready for work when the day workers come on duty. Likewise, they're thoroughly familiar with shutting down equipment when it's not needed. They're our eyes and ears when most of us are home in the evening or off on a holiday."

How do you build a good plant protection force?

Here's the way most companies do it:

Candidates for a spot on the force must be physically fit.

Former police experience is almost a must.

Where sidearms are worn, officers must know how to handle themselves in an emergency. Target practice and instruction in keeping weapons in good working order are routine.

Before a new man is hired, a thorough character check is made. Moral standards, off-duty associates, and general working habits are important.

Good pay—at least equal to the scale of law enforcement officers

PATROL CAR RADIO contact at U. S. Steel's Fairless Works keeps plant's half dozen mobile units constantly alert to meeting any emergency. Units cover nearly 4000 acres, 25 miles of company roads, 24 hours a day.

in the community. Many companies stress attitude, knowledge of job and appearance.

Attitude Important

One company official has this to say about attitude:

"A plant guard is often the first contact a visitor has with a company. The manner in which the visitor is greeted and his questions are answered may greatly affect his appraisal of a company and his subsequent attitude toward it.

"The guard, as gateman, as enforcer of company rules, and as a police officer, also has frequent contact with employees. An improper attitude on his part can do much to damage employee relations. A good attitude can help relations between employee and employer. Guards are expected to be courteous, and to act with restraint."

A good plant policeman also must know guard force regulations, requirements of his particular assignments, company rules, especially the ones he must enforce; layout of the plant and offices of the company, guard or police procedures, safety and fire precautions, and fire-fighting procedures.

INTER-PLANT TELEPHONE and radio communication with fire fighting units, harbor-patrol craft, is directed from plant police central control room. Round-the-clock voice checks help keep men alert to any contingency.

An officer's appearance, many companies have found, is as essential as his performance rating. Neatness enhances unit morale, gives visitors a good impression of the company, and generates respect on the part of employees and outsiders.

Still prevalent, say some executives, is the popular conception that most plant guards are cops put to pasture, just a step ahead of retirement and pension.

In reality, it's pointed out, there's a definite trend on the part of larger companies in particular to maintain modern units, fully equipped to meet any contingency.

At the Fairless Works of U. S. Steel Corp., for instance, the 100-man unit is headed by a captain and four lieutenants. The ranks include former state policemen as well as municipal and federal law officers.

Most of the men are in their mid-30's and 40's. They're well-versed in the use of two-way radio cars, station-to-station intercommunications systems, and the operation of the plant's patrol boat.

Patrol cars can radio the plant's fire control headquarters at a moment's notice should fire break out anywhere in the plant. Fire prevention and detection are among key functions of the force. Swift radio contact also is maintained with the river patrol squad should any waterfront emergency arise.

LIFE-SAVING techniques in artificial respiration are only one of many duties a modern plant protection officer must know. Quick action in time of emergency often means the difference between life or death.

FRINGES: Creeping Up In Your Payroll

Cleveland survey indicates fringes average almost 40¢ per man hour . . . This is an increase of more than 7.7¢ since 1953 . . . Larger companies pay more . . . Cafeterias, coffee breaks all add up.

◆ DO YOU KNOW precisely how much fringe benefits are costing your company? They are probably far more than realized.

While the more obvious (and larger) costs are generally all cut, dried and pro-rated for labor contract negotiation purposes, the little ones have been creeping up unnoticed. Many are probably tossed on bargaining tables by company negotiators as last minute concessions with little thought given to their cost.

But items like cafeterias, time lost in bargaining and grievance meetings, money for welfare funds and laundering and replacement of uniforms are now costing about a half cent each per man hour. For many small and medium sized companies up to 1000 hourly employees, the fringe benefits in total have doubled since 1949 and what are now fringe benefits add up to the total minimum hourly wage in 1939.

It All Adds Up

An indication of how the "drops in the bucket" are adding up is shown in a recent exhaustive survey by Associated Industries of Cleveland which took a cross section of costs from 172 companies employing 76,805 hourly workers and dug deeply into the cost of small items.

This indicated the "hidden payroll" fringe benefits in Cleveland firms have risen 7.7¢ per hour since 1953 to an average of 38.54¢ per man hour. For companies of over 1000 hourly workers it is even higher at 39.62¢ per man hour or a 9¢ increase, based principally on improved insurance, pension and vacation plans. Supplementary unemployment benefits, not included in 1953, were 5¢ per hour, although based on only 3 companies.

But the survey dug far deeper than these big items and uncovered some big drops in the bucket. Cafeteria costs, for example, are .69¢ per man hour; bargaining and grievance time .42¢, credit unions .36¢, pay for time not worked due to death in family, .17¢; employee education, .23¢. Group life insurance including sickness and accident, hospitalization and surgical and medical was over 5¢ per man hour at 5.1¢. Jury duty pay for time not worked cost .21¢. National Guard, Army and Naval Reserve pay for time not worked cost .06¢. Profit sharing payments were 11.20¢ and pensions 8.69¢.

Costs which could be chalked up against the well known coffee break and rest period are 6.39¢ for workers. Among office people it is probably considerably more. Severance pay showed a slight increase in costs in the 2-year period, from .20¢ to .26¢, possibly due to higher wages and resulting higher severance pay rather than any greater labor turnover. Suggestion award systems continue to more than pay their way at the small average cost of .20¢, one of the smallest increments noted.

More and More

And the size and variety of the benefits have shown a great increase. In the survey, there are more than 30 separate benefits covered although the average number per company was 11.2. This showed an increase of almost one benefit per company in the period of 2 years.

Larger companies of 1000 employees or more of which 14 participated in the survey are paying the top figure in employee benefits at 39.6¢ per man hour. These are historically the first to meet new demands from unions and the first to grant them.

Some of the fringe benefits not recurring too often were first aid, intra-plant music, indoctrination, safety and welfare, time off to vote on election day, parking facilities, down-time allowance, and lost time lunch wagon visitation.

What You Don't See In Fringe Benefits

(Cost per man hour)

	cents
Bargaining and Grievance Time	.42
Cafeterias	.69
Bonuses (Christmas, etc.)	3.32
Credit Unions	.36
Deaths in Family (time not worked)	.17
Employee Education	.23
Gifts and Awards	.41
Holidays	5.13
Insurance	4.18
Jury Duty	.21
Unemployment Compensation—Old Age and Survivor's Insurance	6.38
Rest periods	6.39

These and Many Others Total 38.54 Cents

MANAGEMENT

BOSSES: Do Your Workers Like You?

If you know your job, you pass the first test . . . Fairness is important to most workers . . . Superior attitudes are disliked by just about everybody . . . Age pattern varies—By *T. L. Carry.*

◆ HOW DO YOU RATE with your employees?

Bosses, from company presidents down to supervisors and foremen, have no doubt wondered from time to time just how they rated with their workers.

To find some of the answers, and also to give supervisory employees hints on how to improve, the National Office Management Assn. distributed questionnaires to office workers throughout the United States and Canada.

Know Your Job

The idea was to find out what the worker thinks the perfect boss should be like and also to have supervisors use the answers as a checklist against their own ability.

It is unlikely that there will ever be any such thing as a perfect boss, but a study of answers to some of the questions can give supervisory personnel an idea of how close they come to perfection.

An ideal boss, from the workers' standpoint, should have first of all a high degree of managerial skill. In other words, know your job. It doesn't take workers long to find out when a boss is bluffing his way through a difficult problem.

Secondly, the boss must be extremely fair and also possess a good deal of common sense. Workers have little respect for the man who plays favorites but they do not object to the boss being firm but just.

Age Patterns Differ

Answers to some of the questions follow definite age patterns. Where there are a lot of older women in an office, the boss should have a high degree of intelligence. On the other hand, younger women prefer a boss with an understanding nature.

Experience is a prime factor if the boss has to deal with older men.

On the whole, workers do not mind working for a man who is impatient, but they cannot stand a boss who is unjust.

It is also important for the boss to give his people a pat on the back for a job well done. At the same time, he should keep his people informed as to what is going on in the business.

Don't Be Snooty

Superior attitudes and lying are two things that are absolutely out.

Workers don't mind if the boss is lazy but they don't like a man who continually puts things off. This only serves to increase the pressure on a worker.

Women workers don't like a boss who is grouchy. A sense of humor is important to some workers, but most people dislike the man who continually w i s e c r a c k s about things. Older women want the boss to have a good appearance.

Call Me Mister

Don't be stuck up. Your workers prefer that you call them by their first names but they do not mind if they have to "mister."

Here are the qualities, in order of their importance, that a good boss should have:

Managerial skill, fairness, intelligence, common sense, attitude, understanding, energy, humor and patience.

On the minus side, these are the least desirable qualities:

Injustice, superior attitude, untruthfulness, putting things off, know-it-all and grouchiness.

Good workers are only half the production story. Bosses count too.

Payrolls:

Get set for $1 minimum pay rate.

◆ U. S. LABOR DEPT. is getting a head start in enforcing the new $1 minimum wage which goes into effect March 1.

All business firms covered by the Fair Labor Standards Act are being urged to begin now adjusting operations so as to begin paying the new minimum wage when it goes into effect.

In addition, the government warns that it is expanding its investigative staff and field office facilities throughout the nation to enforce the new wage.

The government reminds employers that overtime pay of time and a half for all hours over 40 a week is required and that failure to comply with the minimum wage and hour laws may result in cumulative back wage liabilities—either the employee or the Labor Dept. may sue for back pay—and that severe violations may bring civil or criminal actions.

As a final touch, a Labor Dept. brochure contains a poster which is required to be placed "in a sufficient number of conspicuous places" in an establishment so that each employee has a reasonable chance to see it. The poster reminds employees that they are to get not less than $1 an hour after March 1, and explains how to recover unpaid minimum or overtime wages, and where to make a complaint.

HEATERS: A Customer Talks Back

Industrial heating group hears how to keep sales booming . . . Make sure quotations are clear, says user . . . See that operators learn workings of machine and know maintenance steps—*By G. F. Sullivan.*

◆ SPARKED by a terrific pick up in orders from the steel, aluminum and automotive industries, makers of industrial heating equipment wound up 1955 by more than doubling their 1954 business.

With more than 20 pct of the '55 orders placed in December, it's a safe bet that this will be a banner year for the industry.

Meeting last week in Chicago for their annual business meeting, members of the Industrial Heating Equipment Mfrs. Assn. faced the problem of how to convince industry of the need to replace a lot of "old klunkers" — as one member put it—with more efficient new units.

When You Quote

They heard one of their good customers point up the problem and suggest a number of ways to work on it. He was John Graham, chief metallurgist, International Harvester Co., Chicago, and his suggestions apply to any builder of capital equipment.

Mr. Graham began by asserting that it is becoming more and more expensive to live with old furnaces. But, he said, the builders should tell users what they need in the way of new equipment; suppliers often know more about their customers' needs than the customers themselves. Some of his other points:

Make your quotation as intelligible as you can; break it down; explain everything that isn't crystal clear; and bring it—don't mail it—to the customer. Remember that there are a number of men who must be sold and who must be familiar with your quotation. On furnaces, in addition to the chief metallurgist, these might include the plant engineer, works metallurgist, purchasing agent and the chief process engineer. The salesman's job is to get his information to all the interested people without overly favoring one or neglecting another. One furnace builder said he tries to set up group conferences to give everyone the story at the same time.

If They Order

If you get the order, make the customer learn the wiring, controls, piping, etc. His crew will be much better able to operate and maintain the equipment if he sees it installed step by step rather than having to pick it all up from prints.

Once the unit is installed it becomes either your best salesman or your worst tearer-downer. Go over it thoroughly to be sure it does all it's expected to do. If there's to be a "premiere," run through a rehearsal quietly before the company brass arrives for the show.

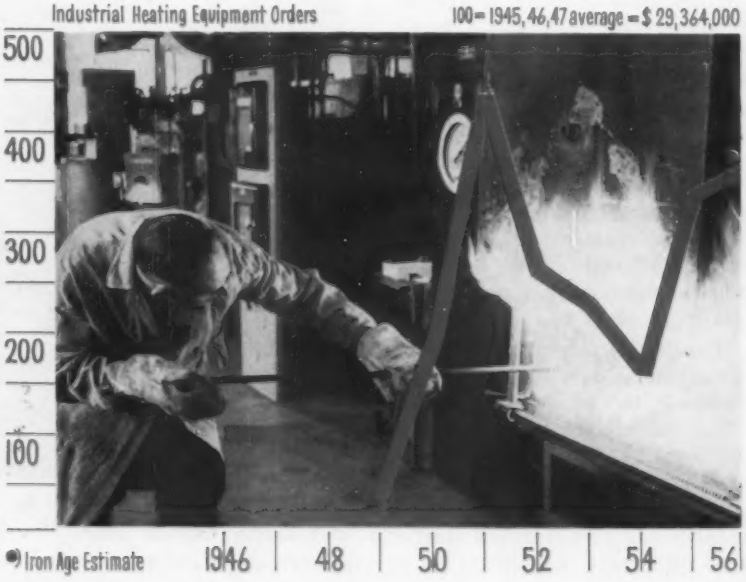
Push Maintenance

Preventive maintenance is weak: The builder can tell the customer, better than anyone else can, how to set up a preventive maintenance program.

But not enough equipment builders take the time to work out such a program. Result is often costly and unnecessary downtime. This, said Mr. Graham, is the biggest single service you can do to help the customer.

IHEA members elected E. E. Staples, Hevi Duty Electric Co., president for the coming year. W. E. Holcroft, Holcroft & Co., was named vice president, while R. E. Whittaker, Swindell-Dressler Corp., was unable to avoid being

Heater Sales Hotter



re-elected association treasurer. The nickel shortage naturally came in for some concern. Heating element alloys were reported in fairly good supply but cast alloys are tight and getting tighter with no relief in sight.

Industry members supplying automotive industry equipment have for years been concerned over varying interpretations of the controversial JIC standards. From a report presented at the meeting, it now appears that almost all of the questionable points have been resolved into a usable form.

NEW HEAD of IHEA is Elton E. Staples of the Hevi Duty Electric Co.

Integrated Titanium

Republic Steel is on the verge of becoming a fully integrated titanium producer. The firm announced negotiations are under way with Crane Co. to buy a half interest, for an undisclosed figure, in Crane's wholly owned subsidiary, Cramet, Inc. Cramet has recently completed a titanium reduction plant at Chattanooga, Tenn., with a government advance of $25 million. It expects to sell 6000 tons annually over a period of 5 years.

Republic is currently developing a rutile mine near Pluma Hidalgo, Oaxaca, in southwest Mexico, which is believed to be the largest deposit of its type in the western hemisphere. Acquisition of an interest in the Cramet reduction plant would give Republic steel a fully integrated operation.

RAW MATERIALS

L.P.F.: Means More Copper

Kennecott to install new process for extracting more metal from ore . . . Initial operation set for Ray Div. early in 1957 . . . Expect output increase of 12 pct.

First commercial use of a leaching-precipitation-flotation process that will extract additional copper from ore will begin in February 1957 at the Ray (Ariz.) Mines Div., Kennecott Copper Co.

The process will cost Kennecott $5 million to install. But it will produce an additional 2 lbs of copper per ton of ore. This will increase the Ray Mines capacity by 12 pct, or 5000 tons per year.

L.P.F. is specifically aimed at ore containing any appreciable content of oxide coated sulfide copper minerals. Heretofore it has been uneconomical to attempt to separate the oxide coating. The mineral was discarded with the tailings.

As early as 1920 a method was discovered to squeeze this extra metal from the ore. But the cost of purchasing the key ingredient, sponge iron, curtailed development.

In the new process the tailings from the alkaline sulfide concentrator are processed to yield pyrite concentrates. The pyrites are roasted and reduced to the sponge iron; sulphur dioxide given off in the process is used to make sulphuric acid. The acid is used to dissolve the oxide copper and the sponge iron is used to precipitate the dissolved copper for final flotation. Thus, in effect, the key ingredients for L.P.F. can for the most part be salvaged from waste and tailings.

Also, previously discarded ore tailings containing sulfide copper oxides may be re-refined.

The process is adaptable to any ore with composition similar to the ore at Ray. One of the world's major copper ore deposits, at Chuquicamatia, Chile, contains ores of a type suitable for process.

BATTERY of rod and ball mills for grinding ore in the concentrator section of a copper sulphide plant. New Kennecott process will take tailings from alkaline sulfide concentrator and derive pyrite concentrates.

PLANT UPKEEP: New Ideas Get Results

Plant maintenance is no longer confined to sweeping up and repair . . . Planned maintenance cuts costly shutdowns, improves production efficiency . . . Conference offers tips—By *R. D. Raddant.*

◆ ARE YOUR production and maintenance people at war?

Are you up to date on preventive maintenance?

Is your plant being painted intelligently?

Is your window washing bill too high?

Are your maintenance jobs planned ahead?

Do you have a satisfactory equipment replacement policy?

Chances are, no plant engineering staff can come up with the right answers to all these questions. But they do point out the diversified problems that confront the plant engineering and maintenance staff of any large plant.

Trying to come up with the right solutions last week were hundreds of plant engineers and maintenance men converging in Philadelphia at the 7th Plant Maintenance and Engineering Show and Conference.

New Responsibility

Time was when plant maintenance was confined to keeping a plant relatively clean and making routine repairs and replacement of equipment when something broke down. But today it's a specialized function reaching the point where the plant engineer shares a lot of the responsibility for production efficiency and cost.

It's estimated by one authority that the maintenance worker represents five pct of a whole plant force and 5¢ out of each dollar of plant costs. But at the same time, it is pointed out that keeping expanding industrial facilities in good repair is increasing in both cost and complexity.

"In many plants, mechanization has already progressed so far that the number of employees required for maintenance has already reached or passed the number employed in operating jobs," says R. I. Reul, industrial engineer, Food Machinery & Chemical Corp., New York.

Realistic Approach

"With the current trend toward automation, this shift can be expected to accelerate even more. In almost every industry, maintenance either is, or soon will be a major cost factor. This increasing importance has thrown the spotlight on the necessity for action to increase the effectiveness of maintenance."

Mr. Reul takes a down-to-earth approach to preventive maintenance, which he says is not a special line of maintenance, but merely a special time for doing it —before it is needed on a predetermined schedule.

Its advantages are (1) minimizing unscheduled shutdowns and (2) making it possible to operate equipment at maximum efficiency.

It tends to reduce repair costs by avoiding damage to associated equipment; reducing need to perform emergency work with costly call-in labor; eliminating or reducing duplication of work; and making it possible to plan and schedule work which allows for better utilization of manpower.

On the other hand, it can in-

Getting Maintenance In Workable Trim

Do your maintenance men know each night what they will do the next day?

Does each man know how long his job is supposed to take?

Is your worker worried about his job security?

Is every man a well qualified journeyman?

Can your men get proper recognition?

Do your men feel there is a reasonable chance for advancement?

Can your department meet all its promises?

Does every one know what the job costs?

Does information circulate freely?

Is your equipment modern?

What is the quality of your leadership?

(From address by Ervin Seltzer, Electric Storage Battery Co.)

crease overall maintenance costs by making it necessary to make inspections to spot incipient troubles and by requiring parts to be discarded on schedule before completely worn out.

Decentralizing Can Help

Mr. Reul advises that "in most cases, implementation of a preventive program that will yield favorable net costs, will require careful collection of facts, intelligent analysis of data, and attentive administration."

In large plant maintenance, John Vonderheide, of General Electric's Appliance Park Project, Louisville, advises a type of decentralized maintenance to serve several individual manufacturing areas.

This is particularly advantageous in periods of extreme production, like that enjoyed in most industries in 1955. At these times, production heads, tied to rigid production schedules, oppose taking down machinery and equipment for periodic inspection and overhaul.

"Inside one of our typical manufacturing department buildings, the maintenance superintendent has decentralized his people into various production areas so that they are right on hand to do maximum maintenance required under the basic plant schedule or program. We feel that this arrangement will come closer to allowing the machines to get the service as prescribed from information recorded as a desired schedule," he says.

Union Carbide & Carbon Corp.'s Bakelite Co. installed a preventive maintenance program four years ago. Its primary purpose was to lower the cost of maintenance by decreasing the number of equipment breakdowns and making corrections early before expensive repairs are necessary.

Its second purpose was to gain close coordination of all crafts through careful planning, calling for records showing how work is scheduled and performed and other general information. Third purpose was to provide a method for collecting, classifying, and using information about plant equipment.

Steel Mill Problems

One result is that 83 pct of all work is now planned and emergencies have become fewer and less frequent. Maintenance force has remained constant, while the plant has expanded. Maintenance overtime has been reduced by almost 6 pct.

John J. Weinman, Yorkville Works, Wheeling Steel Corp., has the specialized job of keeping steel mill equipment operating on a continuous basis, seven days a week, 24 hours a day.

He reports success by removing authority of the assigned area maintenance forces from operating superintendents to maintenance superintendents. At the same time, all craft people were removed from assigned maintenance forces and centralized in the various shops, leaving assigned area forces to consist of millwrights and mechanics only.

Equipment replacement is perhaps the most involved of all plant maintenance and engineering functions. John S. Sayer, manager, maintenance engineering section, E. I. du Pont de Nemours & Co., says the basis for replacement falls into three broad categories: safety, economic, and necessity.

When to Replace

According to Mr. Sayer, economic determination is based on these broad points:

An understanding of your company's particular economic system and how maintenance performance affects profit.

Establishment of maintenance records that will provide you with dollar information in regard to equipment and productive effort.

Periodic analysis of these records to determine areas where equipment replacement or acquisition are justified on a dollar or other basis.

Obtaining management authorization for a proven need.

Proper follow-up to see that purchasing is paying off, and to make sure that management knows it.

Housekeeping Jobs

In the less technical but highly important areas of plant maintenance are such things as proper painting, maintenance of industrial floors, interior cleaning of equipment, and window cleaning.

All of these functions should not be performed on a hit-or-miss basis. Proper study, planning and instruction of personnel are necessary to see that these more or less routine jobs are done in the best manner to assure efficient production and lower costs.

Defense Maintenance: A BIG JOB

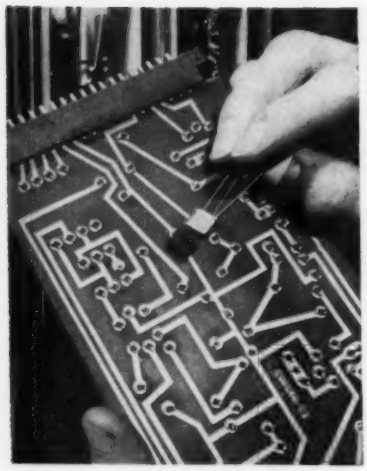
Approximately **250,000 personnel**, both civilian and military, are engaged in real property maintenance of defense installations.

There are **2500 installations** of major and minor categories generating **10 million orders** for repair each year.

These require performance of **30 million individual jobs.**

New facilities are being added at the rate of **$1.5 billion** each year.

Defense maintenance obligations are increasing at a rate of **$60 million** a year.



BIGGEST advantage of printed wiring to the electronics industry is lower per item production cost. Circuits prepared in advance slash overall production time, conserve skilled labor and permit a much greater flexibility of equipment design. Assembly consists mainly of plugging in components rather than time-consuming soldering.

MANUFACTURING

WIRING: Printed Is Better

Industry using more printed circuits . . . Faster assembly and production, fewer rejects, and design flexibility indicate bright future . . . Research going full-blast.

◆ TREMENDOUS growth of printed wiring is another example of a military baby growing to manhood in a civilian atmosphere.

The development of the tiny transistor opened the door for more compact electronic equipment design for armed forces' field and airborne equipment. But circuit components became so small that great difficulty was encountered connecting parts.

Printed wiring was the answer. Circuits consist of copper strips made by etching away unwanted metal from a sheet mounted on an insulator base. Miniaturization which had heretofore been considered impossible became common.

Industry took a long, close look and discovered that printed wiring could be produced faster than conventional at a favorable cost comparison; released valuable skilled labor from assembly operations; and would result in a more standard product.

Extensive research programs have been launched by such organizations as Bell Laboratories and Western Electric.

TECHNICIAN carefully retouches lines on a printed circuit photographic negative. Image will be transferred to a light-sensitive copper foil.

PHOTO-sensitive material is applied to board on a centrifuge rotating to spread the coating evenly. Board has a copper foil top on an insulator base.

PRINTED pattern protects the metal. When the board is dipped into an acid bath copper foil is dissolved, except that covered by the printed pattern.

CLEAN SURFACE OF COPPER WITH
TRICHLOROETHYLENE TO REMOVE
RESIST COATING
2. DIP IN 5% HYDROCLORIC ACID TO
REMOVE OXIDES
3. RINSE AND AIR DRY
4. APPLY FLUX (PRE-HEATED TO 65°F)
5. IMMERSE IN SOLDER BATH FOR 2 x
TO 6 SEC AT 425°F (60-40 EUTECTIC)

Solder is roller coated onto finished circuit to protect against corrosion and make soldering easy. Printed circuits are made faster with fewer rejects.

WAREHOUSES: They Want More Steel

Biggest problem in '56 will be one of obtaining enough steel to meet demand . . . Shipments in '55 set record of nearly 9 million tons . . . Tight items include plates, structurals, and sheets—By G. G. Carr.

◆ TO WAREHOUSEMEN, '56 looks good. Principal cloud in the crystal ball is the problem of geting steel to sell. But on the basis of their customers' clamor for metal, warehouse industry leaders are predicting that the steel industry will run at near-capacity levels throughout this year.

At a press meeting in New York, Robert G. Welch, executive secretary of American Steel Warehouse Assn., pointed to major industrial expansion programs, low steel inventories in fabricators' plants and continued strong volume of warehouse buying, both for current orders and inventory replenishment, as major factors in current steel demand.

"Other supporting factors of considerable importance are new freight cars and both private and public construction commitments," he said.

Warehousemen did a record business of nearly 9 million tons in 1955, compared with 5.9 million tons in '54, and 8.2 million in '53. Inventories are unbalanced, and immediate improvement is most doubtful. With some allowance for geographic variations, tightest products are carbon plates, structurals and sheet and strip. With certain exceptions, cold-finished bars, tubular products and stainless and alloy steels are in relatively good balance in relation to orders.

Leading warehousemen from various parts of the country gave a rundown of availability of major products. L. B. Worthington, president, U. S. Steel Supply Div., reported on carbon plates, shapes and bars, while C. L. Hardy, president, Joseph T. Ryerson & Son, Inc., covered carbon sheets and strip. George L. Stewart, president, Jones & Laughlin Steel Warehouse Div., handled cold finished bars; Lester Brion, Sr., chairman, Peter A. Frasse & Co., stainless steel and tubing, and Frederick H. Lovejoy, president, Wheelock, Lovejoy & Co., alloy steels.

How Warehouse Inventories Stack Up

(months of stock in relation to shipments)

Product	Atlantic States	South	Great Lakes	Central	Pacific
Carbon Plates	1	1	1	1—	2
Structural Shapes	1—	1	1	1—	2
Hot-Rolled Bars	2	3	3	2	4
Cold-Finished Bars	5	4	5	5	6
Sheets & Strip	2	2	3	3	3
Galvanized Sheets	4	5	3	3	4
Mechanical Tubing	5	3	4	5	5
Pressure Tubing	5	3	5	5	4
Standard Alloys	6	4	3	6	6
High Tensile Steel	4	5	3	4	4
Tool Steel	6	6+	5	6	6
Stainless	4	3	4	3	5

In summary, the warehouse picture shapes up this way:

Carbon Plates, Shapes & Bars: Currently, and through the past year, the three tightest products. Plates and structurals are particularly tight, and show little promise of early easing. Warehouse inventories are currently 2 months or less at present demand rates. And seasonal upswing in construction will underline structural scarcity.

Product Picture

Carbon Sheets & Strip: All flat-rolled items are extremely tight. Hot-rolled sheets are particularly scarce, and little easing in supply is expected until middle or end of second quarter. Galvanized sheets, however, are one bright spot in the flat-rolled picture. New capacity may boost supply over demand in second quarter.

Cold-Finished Bars: Warehouse supplies are good. Present stocks cover virtually the complete range of sizes in popular grades and finishes. But resulphurized and leaded grades are short in some areas.

Stainless Steel & Tubing: Nickel shortages complicate the whole stainless picture, which varies with grade and producer. Allocation has been necessary in some instances.

Alloy Stocks Ample

Tubing: Carbon seamless mechanical tube is all over the lot. Mill delivery dates range from 4-22 weeks. Shortages are usually due to lack of ingots rather than of finishing facilities.

Alloy Steels: Mill carryover is about one month at present and will probably stay at that level for first quarter at least. Warehouses now have about 6 months' supply.

Stockpile:

Still a long way to go.

◆ GOVERNMENT in the past five years spent $7.7 billion and has granted about $20 billion worth of tax amortization in an effort to get the nation ready to fight back in case of another war. But there's still a long way to go, a fresh check-up on the state of our defense health shows.

Latest reports from the mobilization agencies show that many of the programs for stockpiling materials and machines and developing crash production capacity are rated as "making progress," although officials still don't know what their needs are.

46 Goals Filled

Out of 75 so-called "minimum" stockpile goals, 46 are filled, and another five are more than 75 pct complete. In the others, stocks on hand range from less than 25 pct of completion to more than 50 pct.

But the goals which need the most attention, according to the Senate-House committee on defense production, include nickel, aluminum, copper, metallurgical fluorspar, battery-grade synthetic dioxide manganese, mica, selenium, and titanium—all extremely important to mobilization. Among the materials in which supplies are "satisfactory" are tungsten, molybdenum, manganese, chrome, cobalt, and vanadium, the committee says.

Deficiencies Exist

In its attempts to promote production capacity, the government, according to the committee, has accomplished little toward correcting deficiencies in components such as boilers, gears, bearings and valves, which in past periods of mobilization have been among the most serious bottlenecks in full defense production. Studies of 30 so-called component areas to attempt to determine how big the production deficiencies are have not yet been completed.

The government has a $70 million loan fund to buy machine tools and facilities to expand the turbine and turbine gear industry, but a final program has not yet been approved by the Office of Defense Mobilization.

One reason for the slowness with which the government has been building up its defense potential is the booming pace of industry for the past 18 months. Military and civilian production has taken a lot of the raw materials, leaving little for the stockpile or for putting into standby equipment. In the case of nickel, copper and aluminum, the government deferred taking scheduled stockpile deliveries to help business meet its demands.

Here are some of the latest mobilization developments:

Copper—Up to now, the committee says, the only copper procured for the national stockpile and the Defense Production Act inventories has been under firm contracts. But the quantity of copper committed to the government under these contracts has dwindled rapidly this year as contracts expired, and consequently diversions of government-scheduled copper in the future are limited.

Nickel — Indications are that there will be a serious supply-demand imbalance of nickel for some time to come. The committee estimates Free World supply will reach 400 million lb in 1956 with the U. S. getting some 290 to 300 million lb.

DEFENSE

Atoms:

AEC reports progress to Congress.

Development of nuclear propulsion for aircraft and surface ships is moving ahead; the Government is developing brand new atomic weapons; and industrial application of the atom is expanding as the country begins to hit its stride in the atomic age.

Atomic Energy Commission is now testing a stationary forerunner of an atomic energy engine for aircraft. Construction will begin this spring on a test power plant large enough for huge aircraft carriers as part of a program for a series of atomic engines ranging from 3000 to 40,000 shaft hp.

The new weapons, the AEC says in its latest report to Congress, are an outgrowth of tests last spring. They are believed to include atomic warheads for anti-aircraft and other guided missiles.

The Government's atomic program has cost $14.4 billion since World War II and produced plant and equipment worth $7.5. It is also expanding private industrial use of the atom at an ever-expanding clip.

AIRBORNE crane, capable of lifting more than its own weight, has been developed by the Corps of Engineers and the American Steel Dredge Div. of American Hoist and Derrick Co. Unit will lift 9 tons with outriggers.

EXPANSION IN INDUSTRY

More Capacity:

Bethlehem to spend $300 million for 3 million tons.

E. G. Grace, chairman of Bethlehem Steel Corp., predicted good demand for steel throughout all of 1956 and then backed up his opinion with the announcement that Bethlehem would spend $300 million on a program designed to boost the company's capacity by 3 million tons.

Primary goal of the project, biggest in Bethlehem's history, will be the addition of 2 million tons to the capacity of the Sparrows Point, Md., plant. By July, 1957, Sparrows Point is expected to be able to turn out 8.2 million tons of steel annually. Mr. Grace stated that it would then be "the world's largest" steel plant.

New capacity will be accomplished by means of a new blast furnace, new open hearth dept. with seven 350 ton furnaces, new roughing mill, tinplate, pipe and sheared plate mills.

The other million tons of additional steel will come from Lackawanna, N. Y., and Bethlehem, Pa., operations.

At the completion of the program the rated capacity of the company would be in the vicinity of 23 million tons annually.

Not included in the $300 million program is the taconite plan of Bethlehem. The company expects to buy $93 million worth of bonds from the Erie Mining Co., in which it holds 45 pct control, to finance additional construction.

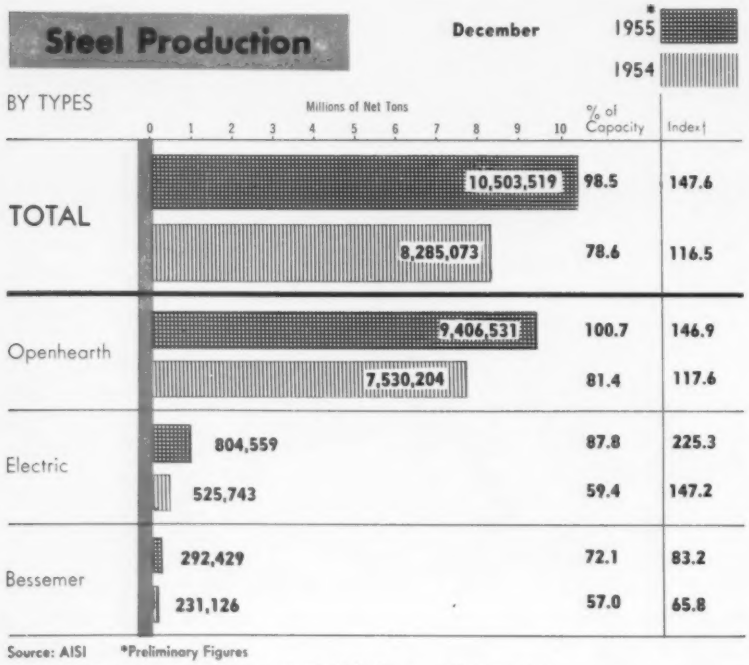
Up $22 Million

Republic Steel Corp. has announced a raise of $22 million in its projected expansion figure to a total of $152 million. Ingot capacity will be raised 1.7 million tons from the originally planned 1.6 million thus giving it a projected total of 12 million tons against the present capacity of 10.2 million.

In Warren, O., and Gadsden, Ala., 24 ft electric furnaces will be installed in place of the originally scheduled 22 ft units. In Cleveland 4 existing open hearths will be enlarged, in addition to the 2 new furnaces being installed. In Chicago wire drawing capacity will be enlarged and a new 10 in. bar mill installed with no additional increase in basic steelmaking capacity.

Taconite project of Reserve Mining Co., Silver Bay, Minn., jointly owned with Armco Steel is operating at 66 pct of capacity and will be at full capacity by March 1. The Labrador iron ore project of which Republic is to receive 25 pct of output will also be operating by Mar. 1.

Steel Production



Source: AISI *Preliminary Figures

†Index of production based on average production of the three years 1947-1948-1949.

Expansion Briefs

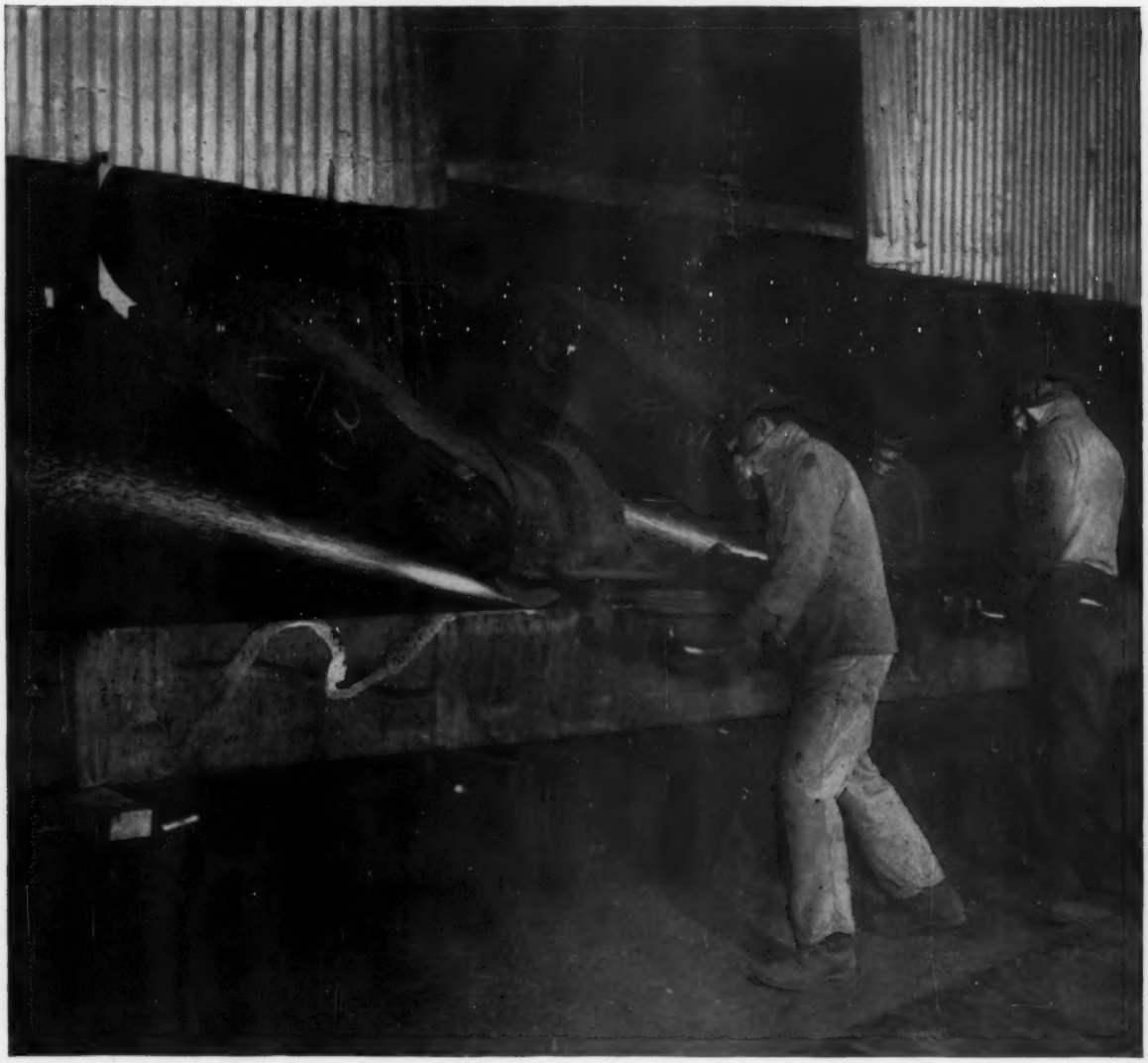
Continental Can Co., New York; builds new plant, Cincinnati; double present can production facilities; produce metal containers for wide variety of products; 370,000 sq ft floor space.

High Voltage Engineering Corp., Cambridge, Mass.; supervoltage particle accelerators; 88,000 sq ft radiation machine test facility; Burlington, Mass.; completion September 1956; $2 million.

Dow Chemical Co., Midland, Mich.; synthetic latex production plant; Pittsburg, Cal.; completion, fall 1956; $1 million.

Volkert Stampings Inc., New York; precision metal parts for electronics industry; 12,000 sq ft plant expansion.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



They give steel a hot rubdown

A typical example of B. F. Goodrich improvement in rubber

THOSE sparks come from grinding wheels that cut through the hard, rough, scaly coating that's on stainless steel when it's first made.

V belts, running at high speed, keep the wheels spinning. But just imagine the jolt to belts when the abrasive wheel bites into steel.

Different kinds of V belts were tried. None lasted more than a few weeks. Some weren't strong enough to take the high speed and jerks. Some weren't flexible enough to take the constant bending over small pulleys.

Then a distributor told the steel company about Grommet belts developed by B. F. Goodrich engineers. The grommets are two extra strong cord loops inside the belts, like twisted cables except that they're endless. High-capacity Grommet belts were put on the grinders. They're so much stronger they last *5 to 6 times longer* than previous belts.

Today's B. F. Goodrich V belts are the result of constant improvement, better processes for prestretching cords, for improving cord adhesion, for reducing internal heat and friction. In these and many other ways B. F. Goodrich belt engineers have successfully attacked the common causes of V belt failure, and in many cases, more than doubled belt service life.

That's why you can be sure of top performance and real money savings when you buy B. F. Goodrich V belts or any rubber product from your B. F. Goodrich distributor. *The B. F. Goodrich Company, Dept. M-548, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

Cinder cars on TIMKEN® bearings start faster—keep rolling longer

TIMKEN® tapered roller bearings in the journal boxes of William B. Pollock Company cinder cars reduce starting resistance by 88% when compared with friction bearings. And these cars roll easier, keep *on* rolling with minimum maintenance and lubrication, load after load, day after day.

With Timken bearings on the job, mill operators no longer need worry about scored axles and worn-out thrust washers. Friction is minimized by the true rolling motion and incredibly smooth surface of Timken bearings.

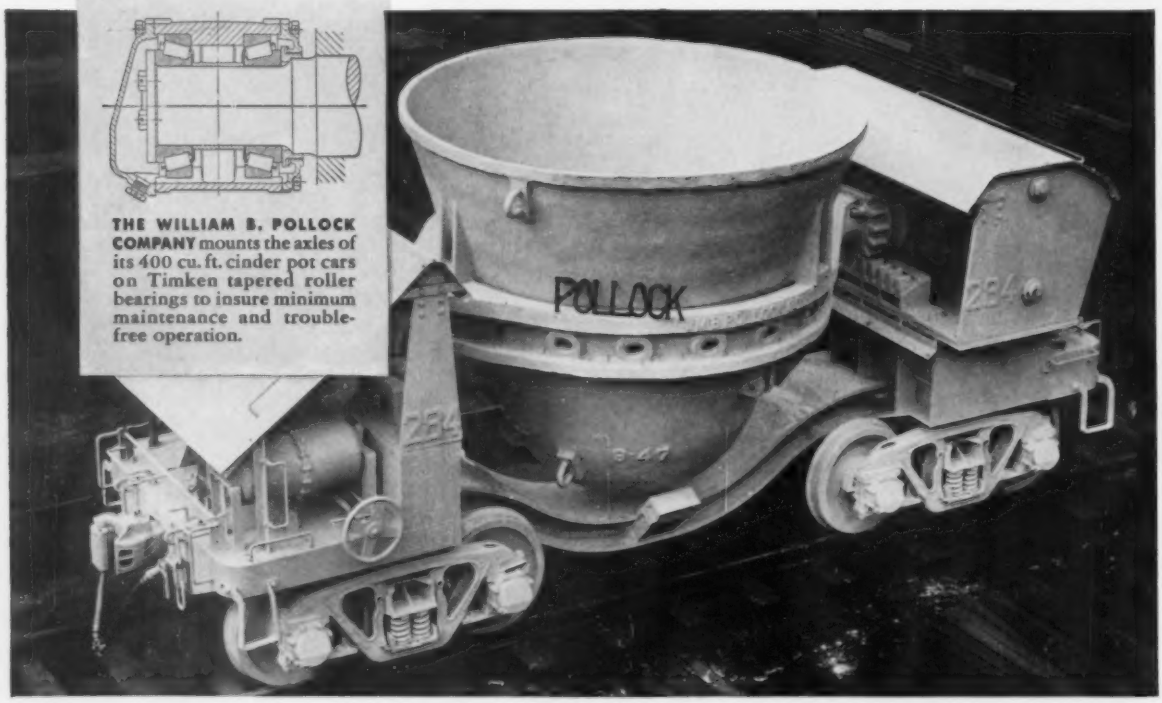
Full line contact between rollers and races gives Timken bearings tremendous load-carrying capacity. Tapered design enables them to carry any combination of radial and thrust loads. And case-hardened surfaces and tough inner-cores permit rollers and races to resist wear and take heavy shock loads. Cars stay on the job with minimum maintenance.

Because they keep housing and axle concentric, closures are made more effective in keeping lubricant in—dirt out. Timken bearings roll the load and cut the cost of lubricant and maintenance time so necessary to keep old-style friction bearings sliding.

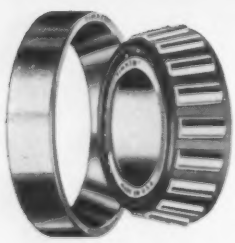
Under normal usage, Timken bearings last the life of the car for these reasons: (1) they are carefully engineered for the job, (2) they're made of Timken alloy steel, and (3) they're precision manufactured.

No other bearings can give you *all* the advantages you get from Timken bearings. Remember, the Timken Company is America's *only* bearing manufacturer that makes its own steel. Be sure the machines you buy use bearings carrying the trade-mark "Timken". It's your assurance of high quality. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



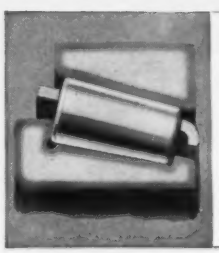
THE WILLIAM B. POLLOCK COMPANY mounts the axles of its 400 cu. ft. cinder pot cars on Timken tapered roller bearings to insure minimum maintenance and trouble-free operation.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

Only Timken tapered roller bearings have these advantages: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. Timken fine alloy steels.

NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER — BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION

Steel Capacity

◆ U. S. steelmaking capacity rose 2.5 million tons during 1955 . . . Industry plans an additional 15-16 million tons in the next three years . . . Blast furnace rise is over 1.5 million tons to new total of 85,485,230.

◆ Buffalo district gain of 463,000 tons tops all other districts, toppling Detroit from sixth place . . . Chicago retains No. 1 spot, but Pittsburgh makes slight gain . . . Future expansion raises problem of financing.

◆ STEELMAKING capacity in the U. S. rose 2,534,780 tons in 1955 to a new total of 128,363,090 tons as of last Dec. 31. This latest increase compares with a rise of about 1.5 million tons in 1954, and a boost of approximately 6.8 million tons in 1953.

Biggest increase in any one year was the 8.9 million tons added in 1952. Total post-World-War-II additions to this country's steelmaking capacity have now reached over 36.5 million tons.

Expansion plans now in the works will add another 15-16 million tons in the next three years, at an estimated cost of $3 billion—or more.

This new compilation of steelmaking capacity by IRON AGE districts is based on detailed official capacity reports just published by American Iron & Steel Institute.

Buffalo Moves Up

Chicago maintained its position as the No. 1 IRON AGE steelmaking district, but lost a little ground to Pittsburgh, the former champ. Pittsburgh added 386,870 tons of new capacity, while Chicago brought in an additional 241,000 tons.

Buffalo, which rung up the largest gain of any district—463,000 tons—jumped ahead of Detroit in district standings, with a new total of 7,015,100 tons. Detroit lost approximately 23,000 tons and dropped to seventh place in district standings.

Other districts showing substantial gains include Philadelphia with 448,800 tons, Youngstown with 433,000 tons, and Wheeling with 200,000 tons.

St. Louis registered a decline of 210,000 tons. Cleveland was unchanged.

Openhearth capacity rose 2,082,880 tons to 112,317,040 tons, while electric furnace capacity increased 451,900 tons to 11,259,080. The steady decline in recent years of Bessemer capacity, halted in 1954, held steady last year at 4,787,000 tons.

Coke Capacity Drops

Blast furnace capacity rose 1,514,130 net tons to a total of 85,485,230 tons.

Total coke oven capacity declined 1,176,350 tons to 71,508,400 tons, despite an increase of 39,150 tons in chemical recovery oven capacity. Abandonment of 1,215,500 tons of beehive capacity accounted for the decline, with total beehive now at 2,092,000 as opposed to 69,416,400 tons for chemical recovery ovens.

While recognizing the need for further expansion, and planning accordingly, industry leaders are becoming more vocal in raising the question of financing.

"Steel's greatest problem today," says Benjamin F. Fairless, president of AISI, "as I see it, is to get the money required to carry the expansion that the country expects." One thing that Mr. Fairless and other industry leaders are inclined to quarrel with is the Government's policy on depreciation.

"Permissible depreciation allowances under the tax laws are inadequate," says Mr. Fairless.

IRON AGE DISTRICT CHANGES AT A GLANCE

IRON AGE District	Pct of U. S. Capacity		Increase in Capacity		Pct of U. S. Increase	District Changes (Pct) By Type of Furnace		
	1956	1955	Net Tons	Pct		Open-hearth	Bessemer	Electric
Chicago	19.67	19.87	241,000	0.96	9.5	1.2	0.00	−1.48
Pittsburgh	18.21	18.27	336,870	1.7	15.27	1.95	0.00	−0.85
Philadelphia	13.48	13.40	448,800	2.7	17.71	3.0	0.00	−4.4
Youngstown	11.20	11.08	433,000	3.1	17.08	2.7	0.00	2.58
West	7.03	7.06	143,450	1.6	5.7	0.7	.....	7.95
Buffalo	5.46	5.39	463,000	7.1	18.27	7.1	.....	0.00
Detroit	5.27	5.21	−22,580	−0.3	−.89	−1.66	.....	3.19
Cleveland	4.86	4.96	.....	0.00	0.00	0.00	0.00	.....
South	4.22	4.15	197,500	3.8	7.8	0.00	.....	78.5
Wheeling	3.95	3.90	200,000	4.1	7.9	4.65	.....	.....
South Ohio River	3.93	3.87	138,240	2.8	5.5	−3.06	0.00	1.65
St. Louis	2.05	2.26	−210,000	−7.4	−8.3	−7.79	.....	0.00
Northeast	0.66	0.58	115,500	15.7	4.6	10.5	.....	33.8
Total	100.00	100.00	2,534,780	2.0	100.0	1.89	0.00	4.18

The **IRON AGE**

Official Steel Ingot Capaciti

Ingot Capacity by Districts

CHICAGO

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons				
	1956	1955	1954	1953	1952
*Alco Products, Inc.	.....	.....	78,000	78,000	78,000
American Steel & Wire Div.	973,000	973,000	973,000	918,000	918,000
Berg Warner Corp.					
Chicago	100,000	100,000	100,000	.....	.....
New Castle, Ind.	64,000	64,000	64,000	64,000	30,000
Total	164,000	164,000	164,000	64,000	30,000
Columbia Tool Steel Co.	6,600	6,600	6,600	6,600	6,600
Continental Steel Corp.	394,000	394,000	394,000	394,000	394,000
A. Finkl & Sons	33,600	33,600	38,600	33,600	.....
Inland Steel Co.	5,200,000	5,000,000	4,700,000	4,500,000	3,750,000
International Harvester Co.	1,000,000	1,000,000	1,000,000	1,000,000	900,000
Joslyn Mfg. & Supply Co.	37,500	37,500	37,500	37,500	37,500
Northwestern Steel & Wire Co.	825,000	825,000	825,000	825,000	321,000
Republic Steel Corp.	1,232,000	1,232,000	1,232,000	1,232,000	1,132,000
United States Steel Corp.					
Gary	7,204,000	7,196,000	7,117,000	6,593,000	6,264,400
South Works	5,441,000	5,470,000	5,470,000	5,016,000	4,891,000
Total	12,645,000	12,666,000	12,587,000	11,609,000	11,155,400
Youngstown Sheet & Tube Co.	2,738,000	2,676,000	2,656,630	2,103,500	1,526,000
TOTAL Chicago District	25,248,700	25,027,700	24,588,700	22,800,600	20,248,500

PITTSBURGH

Allegheny Ludlum Steel Corp.	746,700	746,700	746,700	746,700	746,700
*Alco Products, Inc.	105,160	103,000	103,000	103,000	103,000
American Steel & Wire Div.	1,015,000	1,015,000	1,015,000	900,000	900,000
Armco Steel Corp.	543,000	499,000	499,000	474,000	474,000
Babcock & Wilcox Tube Co.	229,450	229,450	229,450	229,450	133,450
Bethlehem Steel Co.	2,330,000	2,330,000	2,280,000	2,100,000	2,100,000
Braeburn Alloy Steel Corp.	20,730	20,730	20,730	20,730	20,730
Byers, A. M. Co.	90,000	75,000	75,000	75,000	75,000
Colonial Steel Co.	30,000	30,000	30,000	29,820	7,820
Crucible Steel Co.	1,356,000	1,284,000	1,284,000	1,284,000	1,137,000
Edgewater Steel Co.	117,600	89,890	89,890	89,890	89,890
Firth Sterling, Inc.	20,040	20,040	20,040	20,040	20,040
Heppenstall Steel Co.	55,550	55,550	55,550	55,550	55,550
Jessop Steel Co.	33,490	33,490	33,490	33,490	33,490
Jones & Laughlin Steel Corp.					
Aliquippa	1,764,000	1,764,000	1,764,000	1,764,000	1,764,000
Pittsburgh	3,097,500	3,097,500	3,097,500	3,337,500	2,580,000
Total	4,861,500	4,861,500	4,861,500	5,101,500	4,344,000
Latrobe Steel Co.	24,000	24,000	24,000	24,000	25,200
Mesta Machine Co.	105,000	105,000	105,000	105,000	105,000
National Tube Div.	1,446,000	1,446,000	1,446,000	1,224,000	1,224,000
Pittsburgh Steel Co.	1,320,000	1,404,000	1,404,000	1,320,000	1,072,000
Union Electric Steel Corp.	26,760	26,760	27,760	26,760	26,760
Universal-Cyclops Steel Co.	70,160	70,160	70,160	70,160	70,160
United States Steel Corp.					
Clairton	1,064,000	1,064,000	1,064,000	947,000	900,000
Duquesne	1,503,000	1,462,000	1,462,000	1,735,000	2,060,000
Edgar Thompson	2,179,000	2,179,000	2,179,000	2,090,000	2,080,400
Homestead	4,035,000	3,766,000	3,570,000	4,406,000	4,366,000
Johnstown	25,000	25,000	25,000	25,000	24,400
Vandergrift	.....	.....	275,000	275,000	550,000
Total	8,806,000	8,496,000	8,575,000	9,478,000	9,980,800
Vanadium-Alloys Steel Co.	12,000	12,000	11,910	11,910	11,910
Vulcan Crucible Co. (H. K. Porter Co., Inc.)	9,600	9,600	9,600	9,600	9,600
TOTAL Pittsburgh District	23,373,740	22,906,670	23,915,750	23,532,800	22,765,300

* Formerly American Locomotive Co.

PHILADELPHIA

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons				
	1956	1955	1954	1953	1952
Alan Wood Steel Co.	625,000	625,000	625,000	625,000	625,000
Armco Steel Corp. (Rustless Iron & Steel Div.)	102,000	102,000	102,000	102,000	102,000
Baldwin-Lima-Hamilton Corp.	169,960	169,960	169,960	169,960	169,960
Bethlehem Steel Co.					
Bethlehem	3,500,000	3,214,000	3,214,000	3,148,000	3,128,000
Sparrows Point	6,200,000	6,200,000	5,750,000	5,400,000	5,400,000
Steelton	1,500,000	1,356,000	1,356,000	1,312,000	1,312,000
Total	11,200,000	10,770,000	10,320,000	9,860,000	9,840,000
Carpenter Steel Co.	73,700	85,600	85,600	85,850	85,800
Claymont Steel (C. F. & I.)	499,500	499,500	494,570	494,570	468,000
Henry Disston & Sons, Inc. (H. K. Porter Co., Inc.)	25,000	25,000	25,000	25,000	25,000
Eastern Stainless Steel Co.	50,000	32,000	32,000	32,000	14,400
Harrisburg Steel Corp.	100,750	100,750	100,750	100,750	100,750
Lukens Steel Co.	750,000	750,000	750,000	675,000	675,000
Midvale-Heppenstall Co.	325,000	347,100	353,370	324,950	274,650
Milton Steel Products Div. (Merritt-Chapman & Scott)	90,000	67,000	43,000	53,700	53,700
Newport News Shipbuilding & Drydock Co.	12,000	12,000	12,000	12,000	12,000
Phoenix Iron & Steel Co. (Barium Steel Corp.)					
††Harrisburg	490,000	406,000	406,000	406,000	436,000
**Phoenixville	360,000	432,000	432,000	432,000	432,000
Total	850,000	.....	.....	.....	.....
J. A. Roebling's Sons Co. (C.F.&I.)	235,000	235,000	235,000	236,000	204,870
United States Steel Corp.	2,200,000	2,200,000	2,200,000	1,200,000	.....
TOTAL Philadelphia District	17,307,910	16,858,110	16,386,450	14,833,730	13,499,130

VALLEY (Youngstown)

Copperweld Steel Co.	618,380	618,380	618,380	618,380	618,380
Damascus Tube Co.	.....	.....	1,800	1,800	1,800
Empire Steel Co.	500,000	500,000	455,000	455,000	409,500
Industrial Forge & Steel, Inc.	48,600	48,600	48,600	48,600	48,600
Republic Steel Corp.					
Canton	1,125,000	1,125,000	1,125,000	1,125,000	1,125,000
Massillon	620,000	620,000	620,000	620,000	620,000
Warren	900,000	900,000	900,000	900,000	900,000
Youngstown	2,142,000	2,142,000	2,142,000	2,142,000	2,142,000
Total	4,787,000	4,787,000	4,787,000	4,787,000	4,787,000
Sharon Steel Co.					
Farrell	1,170,000	1,000,000	1,000,000	1,000,000	1,000,000
Lowellville	583,000	550,000	550,000	550,000	550,000
Total	1,753,000	1,550,000	1,550,000	1,550,000	1,550,000
Timken Roller Bearing Co.	700,000	648,000	648,000	625,200	547,200
United States Steel Corp.	2,943,000	2,943,000	2,943,000	2,734,000	2,684,000
Youngstown Sheet & Tube Co.					
Brier Hill	1,248,000	1,176,000	1,182,000	1,182,000	1,182,000
Campbell	1,764,000	1,668,000	1,662,000	1,662,000	1,662,000
Total	3,012,000	2,844,000	2,844,000	2,844,000	2,844,000
TOTAL Valley District	14,371,980	13,938,980	13,895,780	13,663,980	13,490,280

†† Previously reported as Central Iron & Steel Co.

** Formerly only capacity reported for Phoenix Iron & Steel Co.

ities By IRON AGE Districts

Source:
American Iron and Steel Institute

ISTRICT—COMPANY	Rated Annual Capacity—Net Tons				
	1956	1955	1954	1953	1952
WESTERN					
ethlehem Pacific Coast Steel Co.					
Los Angeles	452,000	402,000	402,000	402,000	354,000
San Francisco	252,000	252,000	252,000	252,000	240,000
Seattle	246,000	246,000	246,000	246,000	216,000
Total	950,000	900,000	900,000	900,000	840,000
abot Shops, Inc.	12,000	12,000	550,000	.....	.....
ameron Iron Works	58,800	58,800	58,800	58,800	.....
olorado Fuel & Iron Corp.	1,485,000	1,485,000	1,485,000	1,485,000	1,320,000
olumbia-Geneva Steel Div.					
Geneva	1,937,000	1,879,000	1,879,000	1,675,000	1,600,000
Pittsburgh	380,000	391,000	391,000	387,000	364,700
Torrance	222,000	220,000	224,000	214,000	213,700
Total	2,539,000	2,490,000	2,494,000	2,286,000	2,178,400
eneral Services Adm.	.....	.....	.....	72,300	72,300
oster Steel Corp.	12,000	12,000	16,920	16,920	16,920
aascen Iron Works	102,000	102,000	102,000	102,000	102,000
udson Steel Co.	76,500	76,500	76,500	76,500	76,500
aiser Steel Corp.	1,536,000	1,536,000	1,536,000	1,536,000	1,380,000
. G. Le Tourneau, Inc.	83,100	83,100	83,100	138,600	.....
one Star Steel Co.	550,000	550,000	550,000	.....	.....
ational Supply Co.	50,200	50,200	50,200	50,200	63,000
orthwest Steel Rolling Mills	46,000	42,000	42,000	42,000	32,400
regon Steel Mills	120,000	120,000	110,000	110,000	110,000
acific States Steel Corp.	181,770	181,770	181,770	298,000	232,000
eidelhuber Steel Rolling Mill Co.	.....	.....	.....	60,000	48,300
heffield Steel Corp. (Armco)					
Sands Springs	60,000	54,000	54,000	54,000	54,000
Houston	1,080,000	1,050,000	1,050,000	1,050,000	1,050,000
Total	1,110,000	1,104,000	1,104,000	1,104,000	1,104,000
outhwest Steel Rolling Mills	45,000	45,000	45,000	45,000	36,000
exas Steel Corp.	70,450	36,000	36,000	22,320	22,320
OTAL Western District	9,027,820	8,884,370	8,883,290	8,403,640	7,635,140
BUFFALO					
llegheny Ludlum Steel Co.					
Dunkirk	33,000	33,000	33,000	33,000	33,000
Tonawanda	4,500	4,500	4,500	4,500	4,500
Total	37,500	37,500	37,500	37,500	37,500
Bethlehem Steel Corp.	5,520,000	5,100,000	5,000,000	4,740,000	4,020,000
Erie Forge & Steel Co.	234,000	234,000	234,000	234,000	234,000
National Forge & Ordnance Co.	25,000	25,000	25,000	25,000	25,000
Republic Steel Corp.	882,000	882,000	882,000	882,000	882,000
Simonds Saw & Steel Co.	21,600	21,600	21,600	21,600	21,600
Colorado Fuel & Iron Corp.	295,000	252,000	252,000	252,000	240,000
TOTAL Buffalo District	7,015,100	6,552,100	6,452,100	6,192,100	5,460,100
DETROIT					
Allegheny Ludlum Steel Corp.	3,000	3,000	3,000	3,000	3,000
Ford Motor Co.	1,877,420	1,755,000	1,755,000	1,648,200	1,521,280
Great Lakes Steel Co.	3,200,000	3,400,000	3,400,000	3,150,000	2,600,000
(National Steel Corp.)					
McLouth Steel Corp.	1,380,000	1,200,000	967,780	579,700	581,100
Rotary Electric Steel Corp.	300,000	425,000	425,000	425,000	425,000
TOTAL Detroit District	6,760,420	6,783,000	6,550,780	5,805,900	5,130,380
CLEVELAND					
Jones & Laughlin Steel Corp.	1,305,000	1,305,000	1,305,000	1,305,000	1,155,000
National Tube Div.	2,364,000	2,364,000	2,364,000	2,320,000	2,300,000
Republic Steel Corp.	2,572,000	2,572,000	2,572,000	2,572,000	1,900,000
TOTAL Cleveland District	6,241,000	6,241,000	6,241,000	6,197,000	5,355,000

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons				
	1956	1955	1954	1953	1952
SOUTHERN					
Atlantic Steel Co.	450,000	300,000	300,000	300,000	188,000
Connors Steel Div.	115,000	67,500	67,500	67,500	60,000
(H. K. Porter Co., Inc.)					
Kilby Steel Co.	34,020	34,020	34,020	34,020	34,020
Knoxville Iron Co.	38,000	38,000	38,000	38,000	38,000
Republic Steel Co.	789,000	789,000	789,000	789,000	789,000
Tennessee Coal Iron Div.					
Ensley	1,770,000	1,770,000	1,745,000	1,625,000	1,625,000
Fairfield	2,227,000	2,227,000	2,086,000	1,830,000	1,402,000
Total	3,997,000	3,997,000	3,831,000	3,455,000	3,027,000
TOTAL Southern District	5,423,020	5,225,520	5,059,520	4,683,520	4,136,020
WHEELING					
Ohio River Steel Div.	136,080	136,080	136,080	136,080	136,080
(Louis Backman Co.)					
Weirton Steel Co.	2,800,000	2,600,000	2,600,000	2,500,000	2,500,000
(National Steel Corp.)					
Wheeling Steel Corp.					
Benwood	.....	.....	.....	420,000	420,000
Steubenville	2,130,000	2,130,000	2,130,000	1,440,000	1,440,000
Total	.....	.....	.....	1,860,000	1,860,000
TOTAL Wheeling District	5,066,080	4,866,080	4,866,080	4,496,080	4,496,080
SOUTH OHIO RIVER					
American Compressed Steel Co.	21,600	21,600	.....	.....	.....
Armco Steel Corp.					
Ashland	950,000	900,000	870,000	860,000	860,000
Middletown	1,815,000	1,715,000	1,697,000	1,548,000	1,505,000
Total	2,765,000	37,500	2,567,000	2,408,000	2,365,000
Detroit Steel Co.	1,290,000	1,290,000	1,290,000	860,000	650,000
Green River Steel Co.	179,400	198,000	241,920	198,000	.....
Newport Steel Corp.	708,500	708,500	708,500	708,500	708,500
(Merritt-Chapman & Scott)					
West Virginia Steel & Mfg. Co.	78,840	72,000	66,000	78,840	.....
TOTAL South Ohio District	5,043,340	4,905,100	4,875,420	4,053,340	3,723,500
ST. LOUIS					
Granite City Steel Co.	1,080,000	1,290,000	1,290,000	720,000	720,000
Keystone Steel & Wire Co.	425,000	425,000	425,000	400,000	400,000
Laclede Steel Co.	500,000	500,000	440,000	410,000	410,000
Sheffield Steel Div. (Armco)	630,000	630,000	630,000	630,000	480,000
TOTAL St. Louis District	2,635,000	2,845,000	2,785,000	2,160,000	2,010,000
NORTHEAST					
Allegheny Ludlum Steel Co.	77,000	77,000	77,000	77,000	35,000
American Steel & Wire Div.	287,000	287,000	287,000	275,000	275,000
Crucible Steel Co. of America					
Harrison	7,800	7,800	7,800	7,100	2,360
Syracuse	59,600	59,600	59,600	59,600	59,600
Total	67,400	67,400	67,400	66,700	61,960
Northeastern Steel Corp.	303,200	188,280	188,280	188,280	188,280
Washburn Wire Co.	93,000	93,000	93,000	93,000	93,000
Wickwire Brothers, Inc.	21,388	20,800	19,830	.....	.....
TOTAL Northeast District	848,988	733,480	732,510	699,980	646,240

Official Steel Industry Capacities

Source: American Iron and Steel Institute

THE IRON AGE DISTRICTS STEEL CAPACITY

In Thousands of Net Tons—Source: American Iron and Steel Institute—Compilations: The Iron Age

District	1956 Net Tons	1956 Pct of Total	1955 Net Tons	1955 Pct of Total	1954 Net Tons	1954 Pct of Total	1953 Net Tons	1953 Pct of Total	1952 Net Tons	1952 Pct of Total
Chicago	25,249	19.67	25,008	19.87	24,587	19.78	22,801	19.40	20,249	18.65
Pittsburgh	23,374	18.21	22,987	18.27	23,016	18.51	23,533	20.02	22,785	20.96
Philadelphia	17,308	13.48	16,859	13.40	16,386	13.18	14,834	12.62	13,489	12.42
Youngstown	14,372	11.20	13,939	11.08	13,896	11.18	13,664	11.62	13,490	12.42
Western	9,028	7.03	8,884	7.06	8,883	7.14	8,404	7.15	7,635	7.03
Buffalo	7,015	5.46	6,552	5.21	6,452	5.19	6,192	5.27	5,460	5.03
Detroit	6,760	5.27	6,783	5.39	6,551	5.27	5,806	4.94	5,130	4.72
Cleveland	6,241	4.86	6,241	4.96	6,241	5.02	6,197	5.27	5,355	4.93
Southern	5,423	4.22	5,226	4.15	5,060	4.07	4,683	3.98	4,136	3.81
Wheeling	5,066	3.95	4,866	3.87	4,866	3.91	4,496	3.82	4,496	4.14
South Ohio River	5,043	3.93	4,905	3.90	4,875	3.92	4,053	3.45	3,724	3.43
St. Louis	2,635	2.05	2,845	2.26	2,785	2.24	2,160	1.84	2,010	1.85
Northeast	849	0.66	733	0.58	733	0.59	724	0.62	648	0.60
Total	128,363	100.00	125,828	100.00	124,330	100.00	117,547	100.00	108,588	100.00

STEEL CAPACITY BY COMPANIES AN

Annual Steel Capacity (Ingots and Steel for Castings) as of January 1, 1956

	OPEN HEARTH No.	OPEN HEARTH Annual capacity (N. T.)	BESSEMER No.	BESSEMER Annual capacity (N. T.)	ELECTRIC AND CRUCIBLE No.	ELECTRIC AND CRUCIBLE Annual capacity (N. T.)	Total annual capacity (N. T.)
Kinds							
Open hearth—basic	879	111,467,220	....	.....	.....	.....	111,467,220
Open hearth—acid	33	849,830	.....	.....	.....	.....	849,830
Oxygen Converter	.....	.....	.....	.....	3	140,000	140,000
Bessemer	.....	.....	(d) 33	4,787,000	.....	.....	4,787,000
Electric	.....	.....	.....	.....	263	10,719,010	10,719,010
Crucible	.....	.....	.....	.....	1	40	40
TOTAL	911	112,317,040	(d) 33	4,787,000	267	11,359,050	128,363,090
Companies							
Alan Wood Steel Co.	8	625,000	....	.....	.....	.....	625,000
Alco Products, Inc.	3	103,000	....	.....	1	2,160	105,160
Allegheny Ludlum Steel Corporation	5	312,000	....	.....	30	552,200	864,200
American Compressed Steel Corp.	.....	.....	.....	.....	1	21,600	21,600
Armco Steel Corporation	25	2,978,000	.....	.....	9	432,000	3,410,000
Sheffield Steel Division	14	1,440,000	.....	.....	2	300,000	1,740,000
TOTAL	39	4,418,000	.....	.....	11	732,000	5,150,000
Atlantic Steel Company	3	188,000	.....	.....	2	262,000	450,000
Babcock & Wilcox Company	.....	.....	.....	.....	4	229,450	229,450
Baldwin-Lima-Hamilton Corp.	5	160,920	.....	.....	(a) 1	40	160,960
Barium Steel Corporation:							
Industrial Forge & Steel Co.	2	48,600	.....	.....	.....	.....	48,600
Phoenix Iron & Steel Co.	10	804,000	.....	.....	1	46,000	850,000
TOTAL	12	852,600	.....	.....	1	46,000	898,600
Berkman Company, Louis	4	136,080	.....	.....	.....	.....	136,080
Bethlehem Steel Corp:							
Bethlehem Steel Co.	134	18,556,000	3	336,000	4	158,000	19,050,000
Bethlehem Pacific Coast Steel Corp.	10	498,000	.....	.....	3	452,000	950,000
TOTAL	134	19,054,000	3	336,000	7	610,000	20,000,000
Borg-Warner Corporation:							
Ingersoll Steel Div.	.....	.....	.....	.....	4	64,000	64,000
Ingersoll Products Div.	.....	.....	.....	.....	2	100,000	100,000
TOTAL	.....	.....	.....	.....	6	164,000	164,000
Braeburn Alloy Steel Corp.	.....	.....	.....	.....	1	30,730	30,730
Byers Company, A. M.	.....	.....	.....	.....	1	90,000	90,000
Cabot Shops, Inc.	.....	.....	.....	.....	1	12,000	12,000
Cameron Iron Works, Inc.	.....	.....	.....	.....	2	58,800	58,800
Carpenter Steel Company	.....	.....	.....	.....	6	73,700	73,700
Colorado Fuel & Iron Corp.	37	2,379,300	....	.....	.....	.....	2,379,300
Roebling's Sons Corp., J. A.	9	235,000	.....	.....	.....	.....	235,000
TOTAL	36	2,514,500	.....	.....	.....	.....	2,514,500

BLAST FURNACE CAPACITIES BY COMPANIES AND GEOGRAPHIC LOCATION

Annual Capacity of Blast Furnaces as of January 1, 1956

	No. of stacks	Total annual capacity (N. T.)
Companies:		
Alan Wood Steel Company	2	454,800
Armco Steel Corporation	6	1,978,000
Sheffield Steel Division	1	360,000
TOTAL	7	2,338,000
Barium Steel Corporation:		
Phoenix Iron and Steel Co.	1	200,000
Berkman Company, Louis	1	136,800
Bethlehem Steel Company	33	(a) 12,830,000
Colorado Fuel and Iron Corporation	7	1,463,600
Crucible Steel Company of America	3	895,000
Detroit Steel Corporation	2	768,700
Eastern Gas and Fuel Associates	1	195,000
Ford Motor Company	3	1,199,400
Globe Iron Company	1	100,000
Granite City Steel Company	2	450,000
Inland Steel Company	8	3,011,200
Interlake Iron Corporation	6	1,555,600
International Harvester Company	3	731,000
Jackson Iron & Steel Company	1	95,000
Jones & Laughlin Steel Corporation	13	4,587,000
Kaiser Steel Corporation	3	1,314,000
Lavino & Company, E. J.	2	(b) 120,000
Lone Star Steel Company	1	385,000
McLouth Steel Corporation	1	483,500
National Steel Corporation:		
Great Lakes Steel Corporation	4	2,050,000
Hanna Furnace Corporation	4	850,000
Weirton Steel Company	4	2,100,000
TOTAL	12	5,000,000
New Jersey Zinc Company	2	(c) 112,000
Pittsburgh Coke & Chemical Company	3	636,500
Pittsburgh Steel Company	3	980,000
Republic Steel Corporation	22	7,276,000
Sharon Steel Corporation	3	814,400
Shenango Furnace Company	2	445,450
Merritt-Chapman & Scott Corp.:		
Tennessee Products & Chemical Corp.	3	217,740
Tonawanda Iron Division	1	165,000
United States Pipe & Foundry Co.	4	491,710
United States Steel Corporation:		
United States Steel Corp. (Central Operations)	53	(d) 19,159,500
American Steel & Wire Division	6	1,693,000
Columbia-Geneva Steel Division	5	1,804,200

(a) Includes 210,000 tons ferroalloys capacity.
(b) Ferromanganese only.
(c) Spiegeleisen only.
(d) Includes 322,800 tons ferroalloys capacity.

Capacity of Blast Furnaces — January 1, 1956 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Companies (Continued):		
National Tube Division	9	3,255,100
Tennessee Coal & Iron Division	9	(e) 3,209,000
TOTAL	83	(f) 29,120,800
Wheeling Steel Corporation	6	1,800,000
Woodward Iron Company	4	772,630
Youngstown Sheet & Tube Company	13	4,140,000
GRAND TOTAL	361	(g) 85,485,230
Plant Location and Operating Company:		
Alabama (Southern District)		
Birmingham		
Republic Steel Corporation	2	402,000
United States Pipe & Foundry Co.	2	281,230
Ensley		
Tennessee Coal & Iron Division	6	(e) 1,898,300
Fairfield		
Tennessee Coal & Iron Division	3	1,310,700
Gadsden		
Republic Steel Corporation	2	525,000
North Birmingham		
United States Pipe & Foundry Co.	2	210,480
Woodward		
Woodward Iron Company	4	772,630
TOTAL	21	(e) 5,400,340
California (Western District)		
Fontana		
Kaiser Steel Corporation	3	1,314,000
Colorado (Western District)		
Pueblo		
Colorado Fuel and Iron Corporation	4	922,400
Illinois (Chicago District)		
Chicago		
Interlake Iron Corporation	2	587,000
Granite City		
Granite City Steel Co.	2	450,000
South Chicago		
International Harvester Company	3	731,000
Republic Steel Corporation	1	455,000
United States Steel Corp. (Central Operations)	11	4,196,700
Youngstown Sheet and Tube Company	3	684,000
TOTAL	22	7,103,700

(e) Includes 39,000 tons ferroalloys capacity.
(f) Includes 361,800 tons ferroalloys capacity.
(g) Includes 809,800 tons ferroalloys capacity.

Capacity of Blast Furnaces — January 1, 1956 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Indiana (Chicago District)		
East Chicago		
Youngstown Sheet and Tube Company	3	1,296,000
Gary		
United States Steel Corp. (Central Operations)	12	4,782,600
Indiana Harbor		
Inland Steel Company	8	3,011,200
TOTAL	23	9,089,800
Kentucky (Pittsburgh - Youngstown District)		
Ashland		
Armco Steel Corporation	3	810,000
Maryland (Eastern District)		
Sparrows Point		
Bethlehem Steel Company	9	4,272,000
Massachusetts (Eastern District)		
Everett		
Eastern Gas and Fuel Associates	1	195,000
Michigan (Cleveland - Detroit District)		
Dearborn		
Ford Motor Company	3	1,199,400
River Rouge		
Great Lakes Steel Corporation	4	2,050,000
Trenton		
McLouth Steel Corporation	1	483,500
TOTAL	8	3,732,900
Minnesota (Chicago District)		
Duluth		
American Steel & Wire Division	2	491,000
Interlake Iron Corporation	1	146,000
TOTAL	3	637,000
New York (Eastern District)		
Buffalo		
Hanna Furnace Corporation	4	850,000
Republic Steel Corporation	2	618,000
Lackawanna		
Bethlehem Steel Company	7	3,096,000
North Tonawanda		
Tonawanda Iron Division	1	165,000
Tonawanda		
Colorado Fuel & Iron Corporation	2	390,000
Troy		
Republic Steel Corporation	1	263,000
TOTAL	17	5,382,000

Capacity of Blast Furnaces — January 1, 1956 (C

	No. of stacks
Ohio (Pittsburgh - Youngstown District)	
Campbell	
Youngstown Sheet and Tube Company	4
Canton	
Republic Steel Corporation	1
Hubbard	
Youngstown Sheet and Tube Company	1
Jackson	
Globe Iron Company	1
Jackson Iron & Steel Company	1
Lowellville	
Sharon Steel Corporation	1
Martins Ferry	
Louis Berkman Company	1
Massillon	
Republic Steel Corporation	1
Middletown	
Armco Steel Corporation	1
New Miami	
Armco Steel Corporation	2
Portsmouth	
Detroit Steel Corporation	2
Steubenville	
Wheeling Steel Corporation	5
Struthers	
Pittsburgh Coke & Chemical Company	1
Warren	
Republic Steel Corporation	1
Youngstown	
Republic Steel Corporation	5
United States Steel Corp. (Central Operations)	6
Youngstown Sheet and Tube Company	2
SubTotal (Pitts. - Youngs. Dist.)	36
Ohio (Cleveland - Detroit District)	
Cleveland	
American Steel & Wire Division	2
Jones & Laughlin Steel Corporation	2
Republic Steel Corporation	6
Lorain	
National Tube Division	5
Toledo	
Interlake Iron Corporation	2
SubTotal (Clev. - Det. Dist.)	17
TOTAL—Ohio	53
Pennsylvania (Pittsburgh - Youngstown District)	
Aliquippa	
Jones & Laughlin Steel Corporation	5
Braddock	
United States Steel Corp. (Central Operations)	7

AND TYPES

Steel Capacity (Ingots and Steel for Castings) January 1, 1956 (*Continued*)

	OPEN HEARTH		BESSEMER		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Companies (Continued):							
Columbia Tool Steel Co.	....	.....	....	.....	2	6,000	6,000
Continental Steel Corp.	3	394,000	....	.....	....	.....	394,000
Copperweld Steel Co.	....	.....	....	.....	7	618,380	618,380
Crucible Steel Company of America	9	1,044,000	....	.....	17	379,480	1,423,480
Detroit Steel Corp.	14	1,390,000	....	.....	....	.....	1,390,000
Eastern Stainless Steel Corp.	....	.....	....	.....	4	50,000	50,000
Edgewater Steel Co.	3	117,600	....	.....	....	.....	117,600
Empire Steel Corporation	7	560,000	....	.....	....	.....	560,000
Erie Forge & Steel Corp.	5	334,000	....	.....	....	.....	334,000
Finkl & Sons Co., A.	....	.....	....	.....	2	33,600	33,600
Firth Sterling Inc.	....	.....	....	.....	3	20,040	20,040
Ford Motor Company	10	1,649,300	....	.....	5	228,120	1,877,420
Granite City Steel Co.	7	1,080,000	....	.....	....	.....	1,080,000
Green River Steel Corp.	....	.....	....	.....	2	179,400	179,400
Harrisburg Steel Corp.	3	160,750	....	.....	....	.....	160,750
Heppenstall Company	2	50,470	....	.....	1	5,080	55,550
Hoster Steel Corporation	....	.....	....	.....	1	12,000	12,000
Inland Steel Company	40	5,200,000	....	.....	....	.....	5,200,000
International Harvester Company	11	1,000,000	....	.....	....	.....	1,000,000
Isaacson Iron Works	....	.....	....	.....	3	102,000	102,000
Jessop Steel Company	....	.....	....	.....	4	33,490	33,490
Jones & Laughlin Steel Corporation	37	5,583,000	3	582,000	1	1,500	6,166,500
Joslyn Mfg. & Supply Co.	....	.....	....	.....	3	37,500	37,500
Judson Steel Corporation	5	76,500	....	.....	....	.....	76,500
Kaiser Steel Corp.	9	1,535,000	....	.....	....	.....	1,535,000
Keystone Steel & Wire Co.	4	425,000	....	.....	....	.....	425,000
Kilby Steel Company	....	.....	....	.....	1	34,020	34,020
Knoxville Iron Company	....	.....	....	.....	2	38,000	38,000
Laclede Steel Company	4	500,000	....	.....	....	.....	500,000
Latrobe Steel Company	....	.....	....	.....	5	24,000	24,000
Le Tourneau, Inc., R. G.	....	.....	....	.....	3	83,100	83,100
Lone Star Steel Co.	4	550,000	....	.....	....	.....	550,000
Lukens Steel Company	13	750,000	....	.....	....	.....	750,000
McLouth Steel Corporation	....	.....	....	.....	(f)9	(f)1,380,000	1,380,000
Merritt-Chapman & Scott Corp.:							
Milton Steel Prod. Div.	....	.....	....	.....	3	90,000	90,000
Newport Steel Corp.	7	375,300	....	.....	3	333,200	708,500
TOTAL	7	375,300	....	.....	6	423,200	798,500
Mesta Machine Company	4	85,000	....	.....	1	20,000	105,000
Midvale-Heppenstall Co.	4	184,970	....	.....	7	140,030	325,000
National Forge & Ordnance Company	....	.....	....	.....	3	25,000	25,000
National Steel Corp.:							
Great Lakes Steel Corp.	17	3,200,000	(b)2	.....	....	.....	3,200,000
Weirton Steel Co.	13	2,800,000	(b)2	.....	....	.....	2,800,000
TOTAL	30	6,000,000	(b)4	.....	....	.....	6,000,000

Steel Capacity (Ingots and Steel for Castings) January 1, 1956 (*Continued*)

	OPEN HEARTH		BESSEMER		ELECTRIC AND CRUCIBLE		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Companies (Continued):							
National Supply Co.	....	.....	....	.....	3	50,200	50,200
Newport News Shipbuilding & Dry Dock Co.	....	.....	....	.....	3	12,000	12,000
Northeastern Steel Corp.	3	188,280	....	.....	2	114,920	303,200
Northwest Steel Rolling Mills, Inc.	....	.....	....	.....	2	48,000	48,000
Northwestern Steel & Wire Co.	....	.....	....	.....	5	825,000	825,000
Oregon Steel Mills	....	.....	....	.....	3	120,000	120,000
Pacific States Steel Corp.	3	181,770	....	.....	....	.....	181,770
Pittsburgh Steel Co.	12	1,338,000	....	.....	....	.....	1,338,000
Porter Co., Inc., H. K.:							
Connora Steel Div.	....	.....	....	.....	3	115,000	115,000
Disston Div. (Henry)	....	.....	....	.....	2	35,000	35,000
Vulcan Crucible Steel Co.	....	.....	....	.....	2	9,600	9,600
TOTAL	....	.....	....	.....	7	149,600	149,600
Republic Steel Corp.	78	8,222,000	2	665,000	30	1,375,000	10,262,000
Rotary Electric Steel Co.	....	.....	....	.....	6	300,000	300,000
Sharon Steel Corp.	16	1,691,000	....	.....	3	72,000	1,763,000
Simonds Saw & Steel Co.	....	.....	....	.....	3	31,000	31,000
Southwest Steel Rolling Mills	....	.....	....	.....	1	45,000	45,000
Texas Steel Company	....	.....	....	.....	3	70,450	70,450
Timken Roller Bearing Company	....	.....	....	.....	9	700,000	700,000
Union Electric Steel Corp.	....	.....	....	.....	2	26,760	26,760
United States Steel Corp.:							
United States Steel Corp. (Central Operations)	177	24,941,000	(c) 8	1,284,000	9	309,000	26,594,000
American Steel & Wire Div.	26	2,275,000	....	....	....	.....	2,275,000
Columbia-Geneva Steel Div.	19	2,539,000	....	....	....	.....	2,539,000
National Tube Div.	15	2,700,000	6	1,110,000	....	.....	3,810,000
Tennessee Coal & Iron Div.	23	3,997,000	(b) 3	....	....	.....	3,997,000
TOTAL	260	36,452,000	17	2,394,000	9	309,000	39,215,000
Universal-Cyclops Steel Corporation	....	.....	....	.....	5	70,160	70,160
Vanadium-Alloys Steel Co.	....	.....	....	.....	4	13,000	13,000
Colonial Steel Co.	....	.....	....	.....	2	30,000	30,000
TOTAL	....	.....	....	.....	6	43,000	43,000
Washburn Wire Co.	4	93,000	....	.....	....	.....	93,000
West Virginia Steel & Mfg. Co.	....	.....	....	.....	1	78,840	78,840
Wheeling Steel Corp.	11	1,560,000	2	570,000	....	.....	2,130,000
Wickwire Brothers, Inc.	....	.....	....	.....	1	31,380	31,380
Youngstown Sheet and Tube Company	41	5,510,000	2	240,000	....	.....	5,750,000
GRAND TOTAL	911	112,317,040	(d) 33	4,787,000	(e)367	11,259,050	128,363,090

COKE CAPACITY

Annual Coke Capacity as of January 1, 1956

	BEEHIVE		OTHER		Total annual capacity (N. T.)
	No. of ovens	Annual capacity (N. T.)	No. of ovens	Annual capacity (N. T.)	
Companies:					
Alan Wood Steel Company	.....	.....	151	600,000	600,000
Armco Steel Corporation	.....	.....	188	1,057,000	1,057,000
Sheffield Steel Division	.....	.....	60	318,000	318,000
TOTAL	.....	.....	348	1,375,000	1,375,000
Bethlehem Steel Company	.....	.....	2,209	11,450,000	11,450,000
Colorado Fuel and Iron Corporation	.....	.....	266	1,230,000	1,230,000
Crucible Steel Company of America	.....	.....	213	831,000	831,000
Detroit Steel Corporation	.....	.....	108	550,000	550,000
Eastern Gas and Fuel Associates	.....	.....	108	664,000	664,000
Ford Motor Company	.....	.....	280	1,307,200	1,307,200
Granite City Steel Company	.....	.....	76	450,000	450,000
Inland Steel Company	.....	.....	418	2,143,400	2,143,400
Interlake Iron Corporation	.....	.....	390	1,494,000	1,494,000
International Harvester Company	.....	.....	140	664,300	664,300
Jones & Laughlin Steel Corporation	.....	.....	831	3,937,000	3,937,000
Kaiser Steel Corporation	297	180,000	235	1,006,000	1,186,000
Lone Star Steel Company	.....	.....	78	438,000	438,000
National Steel Corporation:					
Great Lakes Steel Corporation	.....	.....	216	1,600,000	1,600,000
Hanna Furnace Corporation	.....	.....	138	*832,700	*832,000
Weirton Coal Company	136	120,000	.....	.....	120,000
Weirton Steel Company	.....	.....	353	1,630,000	1,630,000
TOTAL	136	120,000	905	3,942,000	3,962,000
Pittsburgh Coke & Chemical Company	.....	.....	140	1,000,000	1,000,000
Pittsburgh Steel Company	330	220,000	74	508,000	728,000
Republic Steel Corporation	296	215,000	1,179	*5,310,000	*5,525,000
Sharon Steel Corporation	.....	.....	60	225,000	225,000
Carpenstertown Coal & Coke Co.	585	375,000	.....	.....	375,000
TOTAL	585	375,000	60	225,000	600,000
Merritt-Chapman & Scott Corp.:					
Tennessee Products & Chemical Corp.	.....	.....	44	251,500	251,500
United States Pipe & Foundry Co.	.....	.....	150	754,100	754,100
United States Steel Corporation:					
United States Steel Corp. (Central Operations)	1,733	1,054,000	2,043	14,650,800	15,704,800
American Steel & Wire Division	.....	.....	295	1,416,100	1,416,100
Columbia-Geneva Steel Division	.....	.....	308	1,345,700	1,345,700
National Tube Division	.....	.....	354	1,602,200	1,602,200
Tennessee Coal & Iron Division	.....	.....	538	3,032,500	3,032,500
TOTAL	1,733	1,054,000	4,558	22,049,300	23,103,300
Wheeling Steel Corporation	.....	.....	314	1,720,000	1,720,000
Woodward Iron Company	.....	.....	256	938,000	938,000
Youngstown Sheet and Tube Company	.....	.....	705	3,696,000	3,696,000
GRAND TOTAL	3,367	2,092,000	13,763	69,416,400	71,508,400

* Includes 50% of coke capacity of the Donner-Hanna Coke Corporation, Buffalo, New York

1956 (*Continued*)

No. of stacks	Total annual capacity (N. T.)
4	1,432,000
1	235,000
1	204,000
1	100,000
1	95,000
1	148,600
1	136,800
1	238,000
1	545,000
2	623,000
2	768,700
5	1,554,000
1	182,500
1	516,000
5	1,773,000
6	2,101,400
2	504,000
36	11,177,000
2	752,000
2	740,000
6	2,351,000
5	1,974,800
2	551,000
17	6,268,800
53	17,445,800
5	1,920,000
7	2,730,200

Capacity of Blast Furnaces — January 1, 1956 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Pennsylvania (Pittsburgh - Youngstown District) (Continued):		
Clairton		
United States Steel Corp. (Central Operations)	3 (a)	630,800
Donora		
American Steel & Wire Division	2	450,000
Duquesne		
United States Steel Corp. (Central Operations)	6 (b)	1,338,800
Farrell		
Sharon Steel Corporation	2	665,800
McKeesport		
National Tube Division	4	1,380,300
Midland		
Crucible Steel Company of America	3	895,000
Monessen		
Pittsburgh Steel Company	3	980,000
Neville Island		
Pittsburgh Coke & Chemical Company	2	654,000
Pittsburgh		
Jones & Laughlin Steel Corporation	6	1,927,000
Rankin		
United States Steel Corp. (Central Operations)	6	2,236,800
Sharpsville		
Shenango Furnace Company	2	445,450
SubTotal (Pitts. - Youngs. Dist.)	51	16,162,350
Pennsylvania (Eastern District)		
Bethlehem		
Bethlehem Steel Company	7	2,708,000
Birdsboro		
Colorado Fuel and Iron Corporation	1	151,200
Chester		
Barium Steel Corp.:		
Phoenix Iron and Steel Co.	1	200,000
Erie		
Interlake Iron Corporation	1	271,000
Fairless Hills		
United States Steel Corp. (Central Operations)	2	1,134,000
Johnstown		
Bethlehem Steel Company	7 (c)	1,746,000
Palmerton		
New Jersey Zinc Company	2 (d)	112,000
Sheridan		
Lavino and Company, E. J.	1 (e)	56,000
Steelton		
Bethlehem Steel Company	3	1,008,000
Swedeland		
Alan Wood Steel Company	2	454,800
SubTotal (Eastern Dist.)	27	7,841,000
TOTAL—Pennsylvania	78 (f)	24,003,350

(a) Includes 85,200 tons ferroalloys capacity.
(b) Includes 237,600 tons ferroalloys capacity.
(c) Includes 216,000 tons ferroalloys capacity.
(d) Spiegeleisen only.
(e) Ferromanganese only.
(f) Includes 706,800 tons ferroalloys capacity.

Capacity of Blast Furnaces — January 1, 1956 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Tennessee (Southern District)		
Lyles-Wrigley		
Merritt-Chapman & Scott Corp.:		
Tennessee Products & Chemical Corp.	1	36,300
Rockwood		
Merritt-Chapman & Scott Corp.:		
Tennessee Products & Chemical Corp.	2	181,440
TOTAL	3	217,740
Texas (Southern District)		
Houston		
Sheffield Steel Division	1	360,000
Lone Star		
Lone Star Steel Company	1	385,000
TOTAL	2	745,000
Utah (Western District)		
Geneva		
Columbia-Geneva Steel Division	3	1,321,500
Ironton		
Columbia-Geneva Steel Division	2	482,700
TOTAL	5	1,804,200
Virginia (Southern District)		
Lynchburg		
Lavino and Company, E. J.	1 (a)	64,000
West Virginia (Pittsburgh - Youngstown District)		
Benwood		
Wheeling Steel Corporation	1	246,000
Weirton		
Weirton Steel Company	4	2,100,000
TOTAL	5	2,346,000
DISTRIBUTION BY DISTRICTS:		
Eastern	54 (b)	17,690,000
Pittsburgh-Youngstown	95 (c)	30,495,350
Cleveland-Detroit	25	10,001,700
Chicago	48	16,830,500
Southern	27 (d)	6,427,080
Western	12	4,040,600
TOTAL	261 (e)	85,485,230

(a) Ferromanganese only.
(b) Includes 384,000 tons ferroalloys capacity.
(c) Includes 322,800 tons ferroalloys capacity.
(d) Includes 103,000 tons ferroalloys capacity.
(e) Includes 809,800 tons ferroalloys capacity.

The IRON AGE

Want Extra Copies?

A limited number of reprints of this data will be available upon request to Readers' Service Dept., The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

Cinder cars on TIMKEN® bearings start faster—keep rolling longer

TIMKEN® tapered roller bearings in the journal boxes of William B. Pollock Company cinder cars reduce starting resistance by 88% when compared with friction bearings. And these cars roll easier, keep *on* rolling with minimum maintenance and lubrication, load after load, day after day.

With Timken bearings on the job, mill operators no longer need worry about scored axles and worn-out thrust washers. Friction is minimized by the true rolling motion and incredibly smooth surface of Timken bearings.

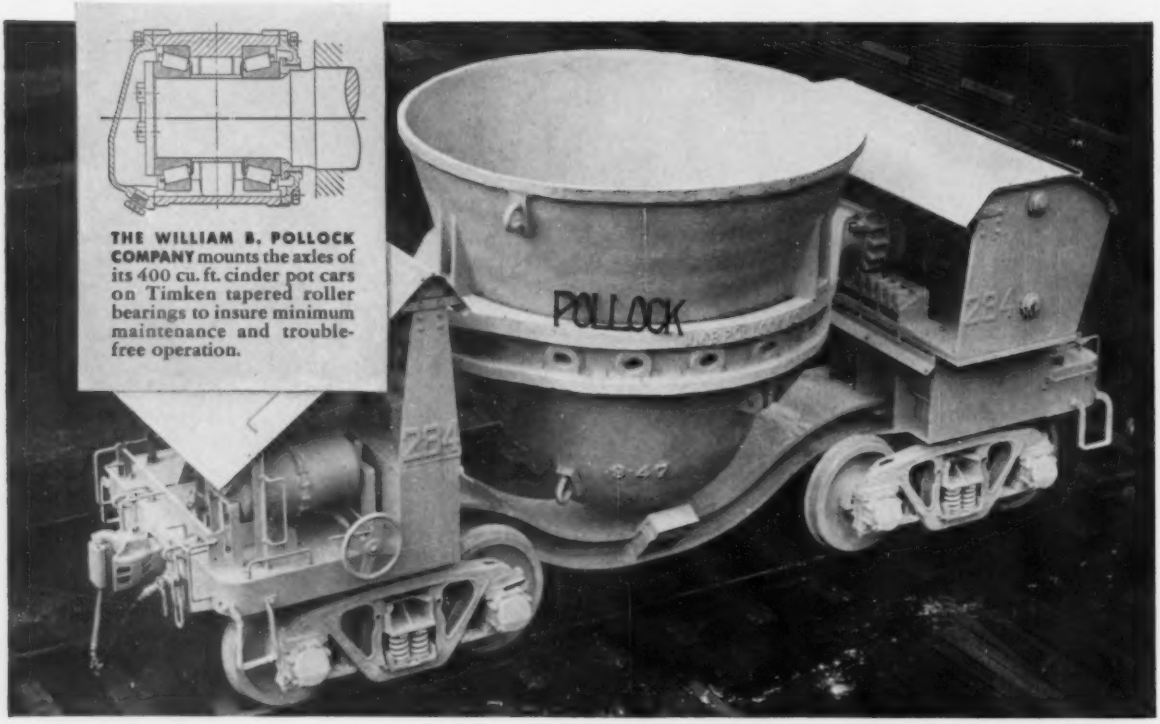
Full line contact between rollers and races gives Timken bearings tremendous load-carrying capacity. Tapered design enables them to carry any combination of radial and thrust loads. And case-hardened surfaces and tough inner-cores permit rollers and races to resist wear and take heavy shock loads. Cars stay on the job with minimum maintenance.

Because they keep housing and axle concentric, closures are made more effective in keeping lubricant in—dirt out. Timken bearings roll the load and cut the cost of lubricant and maintenance time so necessary to keep old-style friction bearings sliding.

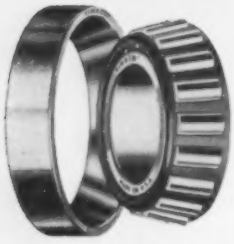
Under normal usage, Timken bearings last the life of the car for these reasons: (1) they are carefully engineered for the job, (2) they're made of Timken alloy steel, and (3) they're precision manufactured.

No other bearings can give you *all* the advantages you get from Timken bearings. Remember, the Timken Company is America's *only* bearing manufacturer that makes its own steel. Be sure the machines you buy use bearings carrying the trade-mark "Timken". It's your assurance of high quality. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

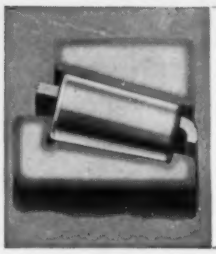
This symbol on a product means its bearings are the best.



THE WILLIAM B. POLLOCK COMPANY mounts the axles of its 400 cu. ft. cinder pot cars on Timken tapered roller bearings to insure minimum maintenance and trouble-free operation.



TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

Only Timken tapered roller bearings have these advantages: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. Timken fine alloy steels.

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

REPORT TO MANAGEMENT

The Business Pulse—It's Strong

You don't have to guess too much about the rest of this year. Business is in its most healthy condition in years.

Everyone knows that 1955 was a good year, but you are used to big sales years followed by not so big corporate profits. The tax rates are still so high that you have reason to look back on the "good old days." But last year showed signs of restoring some normal relationships.

Business as a whole was able to hold on to some of its cash—about $10.5 billion of what the Dept. of Commerce calls retained profits. This is more than 50 pct above the 1954 total and substantially higher than 1953.

Total national income for the year will probably come out to more than $320 billion, about $224 billion of that going to payrolls or other employee compensation. Profits before taxes were well over $40 billion, compared with $38 billion in 1953 and $34 billion in 1954.

Look for Higher Freight Rates

Keep your eye on the Interstate Commerce Commission's decision on the current railroad demand for a 7 pct general rate hike. It is the tipoff on possible higher rates for all types of surface freight carriers.

Rail lines propose to put higher charges to work starting Feb. 25, unless the ICC blocks the action before that date. If the government allows the new rates to go into effect, truckers, coatwise and intercoastal firms and barge lines all expect less trouble in getting bigger fees.

ICC recently approved a six pct increase in rates charged by the New England trucking firms on shipments in their region. Southern truckers want a 7 pct increase. Ship operators and barge lines are also asking authority to raise rates 7 pct. If the rail hike goes through, ICC will probably grant the increases, if only to keep water and rail fees competitive.

Are Tax Cuts Statesmanlike?

Among the reasons why you won't get much, if any, tax relief in the current session of Congress is the growing feeling that advocating tax cuts just isn't good politics.

There's evidence indicating that the public considers it more statesmanlike for a congressman, senator, or candidate to stand up and say "this is not the time to gamble on national security." Or he may say that a reduction in debt should come first.

Not that this may not be sound reasoning. There are valid arguments that it is. But it isn't the kind of political talk you used to expect in a national election year.

One of the nation's most prominent congressmen, and an advocate of economy, concedes that political value of cutting taxes is over-rated. Twice in recent years, the Republicans advocated or effected tax cuts when in control. But this didn't preserve the GOP's majority. Conclusion: voters either don't care or have short memories.

Get Ready for New Minimum Wages

If the new minimum wage rate applies to your company, it's time to start planning for it. The new minimum rate of $1 per hour goes into effect March 1. The new rate is now part of the Fair Labor Standards Act.

Like any other change in labor laws, it can cause a lot of trouble if you aren't prepared to make necessary changes. Planning ahead can avoid errors in setting wage rates, figuring overtime, and other payroll problems. It can also avoid possible penalty for failure to comply.

INDUSTRIAL BRIEFS

Enters Field . . . Corning Glass Works has established a Refractories Div. to consolidate development, manufacture and sale of conventional refractories, special high temperature refractories and Glascast Mold material for casting of metal alloys.

Hits The Spot . . . Mark 91 and Mark 92 are giant electro-mechanical brains developed to guide rockets fired from a ship against short troop concentrations. They are constructed for the Navy by Ford Instrument Co., Div. of Sperry Rand Corp., N. Y.

Shift . . . Luria Steel & Trading Corp. has moved its Cleveland office to 2408 Terminal Tower.

Trademark Diamond . . . A three dimensional exhibit celebrating the diamond anniversary of the enactment of the first constitutional trademark law was held in the lobby of the Dept. of Commerce Building, Wash., D. C. The theme was the impact of trademarks on present day economy.

Highest Honors . . . The Navy Meritorious Public Service Citation has been presented Raymond A. Quadt, director of research for the Hunter Douglas Aluminum Corp. The award, the first the Navy has granted in the past three years, was made for Mr. Quadt's contribution to the Navy in research on cold forging heat treatable aluminum alloys.

Coast to Coast . . . Standard Screw Co., Bellwood, Ill., large manufacturer of screw machine products, has purchased the Ravenna Metal Products Corp., Seattle. The new acquisition will function as a subsidiary, giving Standard manufacturing outlets from coast to coast.

Spreading Out . . . Hartford Special Machinery Co., Hartford, Conn., manufacturers of drilling and tapping machines, thread rollers and die polishing machines has appointed C. B. Kopecky Co., Syracuse, N. Y., as sales representative in northeastern New York, and Henry Upjohn Co., Kalamazoo, Mich., sales representative in western Michigan.

Nuclear Assist . . . AEC industrial information depository at Stanford Research Institute, set up to assist industry in utilization of atomic energy information, recently acquired 5000 unclassified reports to bring their total to 8500 papers on atomic energy technology. Library, reference and literature-search service is provided without charge. Photostatic copies cost 40¢ per page.

Scotch Blend . . . Caterpillar tractor Co., Peoria, Ill., will build a plant in Glasgow, Scotland, for manufacturing crawler tractors. The operation will be run by Caterpillar Tractor Co., Ltd., of Great Britain, a subsidiary.

Educated Atoms . . . ACF Industries Inc., will design and construct a nuclear research reactor for the Massachusetts Institute of Technology. Project will get underway as soon as approval is secured from the AEC.

Up the Schuylkill . . . G. J. Keady, president of Sharples Corp., Philadelphia, has purchased the Philadelphia Steel & Iron Corp., Conshohocken, Pa., manufacturers of high pressure forged fittings; stainless, alloy and carbon forged steel pipe flanges.

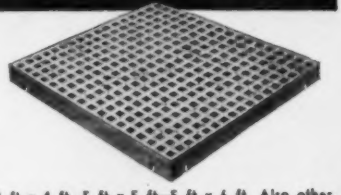
Strike It Rich . . . Stauffer Chemical Co. has established existence of large mineable deposits of high grade phosphate rock on its patents near Bear Lake, Idaho. Reserves are estimated at 5 million tons of commercial grade rock, may be doubled or tripled if beneficiation of lower grades proves feasible.

Fast Order . . . Phillips Petroleum Co. has placed an order for five high-speed turbines with the General Electric Company's Small Turbine and Supercharger Dept. Units will be used to drive compressors at the petroleum firm's new ethylene plant at Sweeney, Texas.

Iron Man . . . Armco Steel Corporation's "Iron Man," one of the oldest safety trophies in the U. S., has been won by the company's Middletown Works. The Middletown group compiled a record of only 0.35 lost-time accidents per million man hours worked.

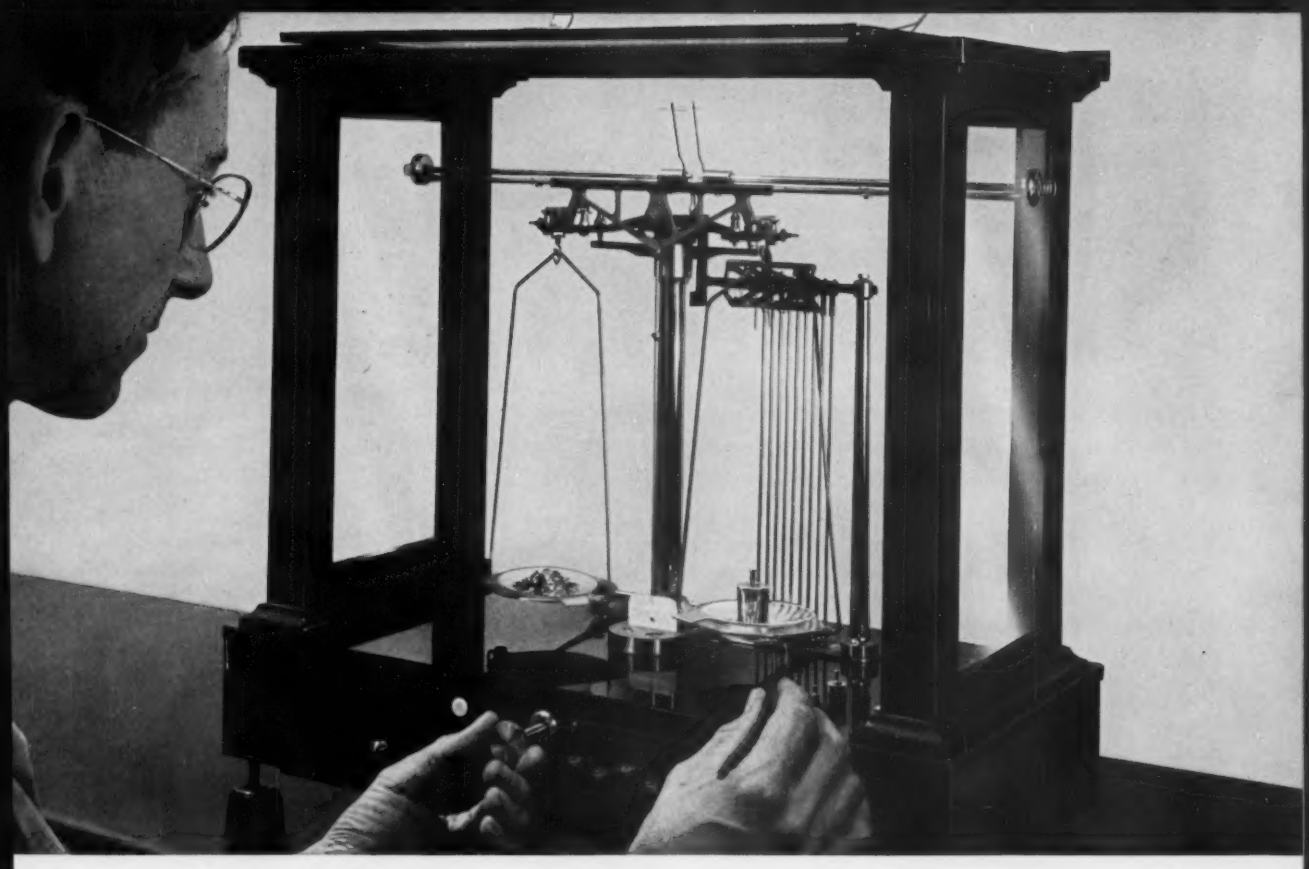
Atomic Switches . . . A contract for the complete control system for the 1000 kw Livermore Pool-Type Nuclear Reactor has been awarded to Leeds & Northrup Co., Philadelphia instrument manufacturer, by Foster Wheeler Corp., prime contractor for the reactor's construction.

BENDING BLOCKS or WELDING PLATENS

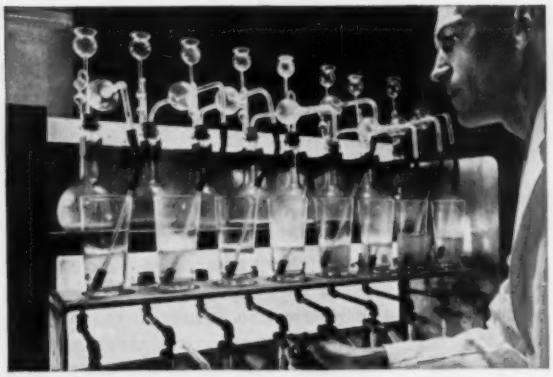


4 ft x 4 ft—5 ft x 5 ft—5 ft x 6 ft. Also other sizes. Cast steel blocks for layout, welding & assembly. Tools, stands & accessories. Write today for information.

ACORN IRON & SUPPLY CO.
Delaware Ave. & Poplar St. Philadelphia 23, Pa.



How Great Lakes Steel *weighs* quality



IN A QUALITY CONTROL LABORATORY, chemical analyses such as these, are run on every heat. Then . . .

THE ANALYSES are telautographed immediately to the melter so he can add elements to meet customer's requirements.

How much does quality weigh? In the photograph above, a test sample is being weighed for chemical determinations. Tests like this give our open-hearth operators a running check on molten steel while it is still in the furnace; enable them to pour heat after heat of high and uniform quality.

In every department at Great Lakes Steel, from raw material docks to delivery of finished steel, the emphasis is on quality—on seeing that customers receive steel that meets their particular requirements.

Do you have a manufacturing problem involving flat-rolled steel? A call to Great Lakes will make available to you the experience of our entire organization.

GREAT LAKES STEEL CORPORATION

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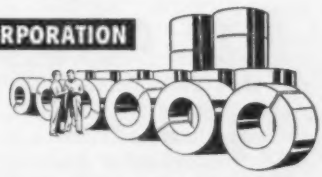
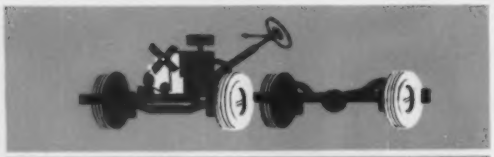


District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.



AUTOMOTIVE ASSEMBLY LINE

How Packard Set Its Comeback Stage

As part of full line Studebaker-Packard Corp., division does not stand alone . . . Engineering innovations play big part . . . Supplier aid gets credit . . . New labor contract helps—*By T. L. Carry.*

◆ LAST FALL, when Studebaker-Packard Corp. introduced its 1956 cars, James J. Nance, president of the company, made no firm predictions regarding the outlook this year. Mr. Nance would only say, "This is our year to move up."

What did he mean?

Mr. Nance knows, as do all other auto executives, that the successful formula for growth in the industry is the development of full-line manufacturing and marketing programs. A line of cars with a price for all classes of consumers is necessary for success in this market.

Thus, after the merger of Studebaker and Packard in 1954, it was the announced objective of the company to become the nation's fourth full-line producer of automotive vehicles.

Some Progress . . . In the light of this objective, it is interesting to note that the corporation's Packard-Clipper Div. has made notable progress toward the goal.

How the division developed its products in a very short time is a story in itself.

Within a period of 2 years, the division designed two new lines of cars, a V-8 engine, and refined a torsion bar suspension. Other engineering advances include an electric push-button driving control and a non-slip differential.

At the same time that all this was going on, the division moved its manufacturing operations into new and modern facilities.

Cut Manufacturing Costs . . . The move, accomplished in less than 60 days, involved the hauling of 5000 truckloads of machines, material and equipment. In addition, more than 3 miles of conveyors and 5000 small tools were also transported to the new facility.

The object of the move was to put production costs on a competitive basis with other manufacturers. Packard's manufacturing facilities were previously scattered over five floors.

The move to a one-floor operation reduced costs as much as 40 pct. Production in the new plant is still the same as it was previously but 2 million sq ft less of floor space is required.

Revise UAW Contract . . . Another important factor in reducing costs was the dumping of an antiquated labor contract and negotiating an agreement that put the division on an equal basis with other producers.

Packard has followed closely Mr. Nance's philosophy that a planned program must follow its product.

The division is now at the point where it has cut costs, modernized facilities and is now ready to launch an aggressive merchandising program. Packard is not out for blood this year. It just wants to make money.

Robert P. Laughna, division general manager, states the problem quite simply by asking: "Do you want to buy all your automobiles from three major companies?"

Get Outside Help . . . The springboard for the selling program is the engineering advances that

Volkswagen Retreats to Home Shores

◆ PLANS to manufacture the Volkswagen in the U. S. have been cancelled. Company officials concede that "it appears doubtful" if the German car can be manufactured here at a profit.

In retreating from its plans to produce the cars in the U. S., the company still has on its hands the $4 million building at New Brunswick, N. J., purchased from Studebaker-Packard.

Dr. Heinz Nordhoff, director general of the German firm, points out that Volkswagen U. S. sales had increased from 8000 in 1954 to approximately 35,000 cars this year, is confident of doubling that figure in 1956.

"When we were in the States last October, studies were well under way to determine the most economically feasible method of supplying the rapidly growing American demand for our automobiles," he stated.

"At that time, it appeared that we would be able to produce Volkswagens locally at a profit. However, with the completion of more exhaustive investigations, it appears doubtful that this can be successfully accomplished. Rather than increase prices or sacrifice to the slightest degree the high quality . . . we will be compelled to continue our present system of operations."

Getting set to pound some strength into bolt heads

HERE ARE three essentials for producing strong, low cost fasteners ...an ingenious machine, indispensable skill and proper material.

That's a cold header you see. It deals wire terrific blows, forcing it to flow cold inside dies. Skillfully set up, it spills out bolt or screw blanks by the thousands per hour—all with *strong*, sound heads.

Making precise adjustments on the machine is Douglas Dunaway. With RB&W for ten years, he's one of many long-timers whose experience assures high quality output from a vast array of modern equipment.

The cold heading method (an RB&W development that revolutionized bolt making) calls for use of uniform, high quality raw material. With constant quality control, RB&W makes *sure* cold headers get the proper "diet".

It's this combination of facilities, experience and quality control in all RB&W plants that assures more fastener quality for your money . . . a truly reliable supply source . . . and strong fasteners that never let you down.

Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

R B & W

110th year

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Seattle. **Distributors** from coast to coast.

DIFFICULT JOBS ARE *routine on*

DE VLIEG SPIRAMATIC JIGMILS®

PHOTO COURTESY OF DANROY BORING CO.

DeVlieg *SPIRAMATIC* JIGMILS® permit accurate machining of workpiece from 4 sides at 1 setting!

The above photograph, taken in a well known Detroit Tool Shop, illustrates a Special Hydraulic Fixture being machined on a DeVlieg Model 3B-48 *SPIRAMATIC* JIGMIL. This job was completely machined on four sides at one setting to precise limits of accuracy and operations included drilling, boring, milling and O.D. turning 22" diameter trunnion.

Come to Detroit...

See a practical demonstration of the JIGMIL Technique

DE VLIEG MACHINE COMPANY

450 Fair Avenue, Ferndale • Detroit 20, Michigan

Write for Illustrated Catalog

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Jan. 28, 1956	143,107	27,389
Jan. 21, 1956	150,778	25,711
Jan. 29, 1955	167,190	23,278
Jan. 22, 1955	167,071	23,084

*Estimated. Source: *Ward's Reports*

have been introduced on both the Packard and Clipper lines this year.

Mr. Laughna is proud of these achievements and gives much of the credit for their adoption to Packard's suppliers. He is quick to point out that 7 out of 10 of the advancements in this year's cars came from outside sources. He also adds that the relative smallness of the company accounts for this fact.

None of the Packard executives has such a large staff that he has to justify its existence by insisting that all product ideas originate within the company.

Packard's ultimate sales goal is still 5 pct of the new car market. Whether or not the company makes it this year remains to be seen. The important thing is that after many years, Packard is in a most advantageous position at least to try for good gains.

Sales Race:

Chevrolet wins but 8's make big gains.

The perennial feud between Ford and Chevrolet began warming up this week in Detroit.

Ford, recognizing that it doesn't stand a chance of winning the overall 1955 sales race with its No. 1 competitor, is at least claiming a moral victory.

Figures released by R. L. Polk & Co., auto statistical agency, show that Ford sold more cars, powered with V-8 engines, than any other producer in the country. Ford's total sales of V-8 cars for the first 11 months of 1955 were 1,241,742 compared with 634,376 for Chevrolet, or as Ford puts it, the nearest competitor.

At best, the sale of more V-8's is no more than a moral victory. Total registration figures for the first 11 months show that Ford was behind Chevrolet by almost 50,000 cars. Chevrolet sold 1,479,529 autos compared to 1,429,580 for Ford.

6's Dwindle

It is, however, significant to note the public trend toward V-8 engines. Ford's production of V-8's was nearly 90 pct while Chevrolet produced just over half.

The time is not far off when the 6-cylinder engine will be almost as obsolete as a manual transmission.

One of the few remaining big markets for the 6-cylinder car is beginning to dwindle. Fleet owners and operators are no longer buying cars with this type of engine. Even cab companies are switching to 8-cylinder automobiles because they know that trade-in and resale values are much higher.

Chevrolet, no doubt, plans to increase the ratio of its V-8 production this year. But because of a slow start, it will be quite a while before the GM division will be able to equal Ford on that basis.

AUTOMOTIVE NEWS

Pike's Peak or Bust

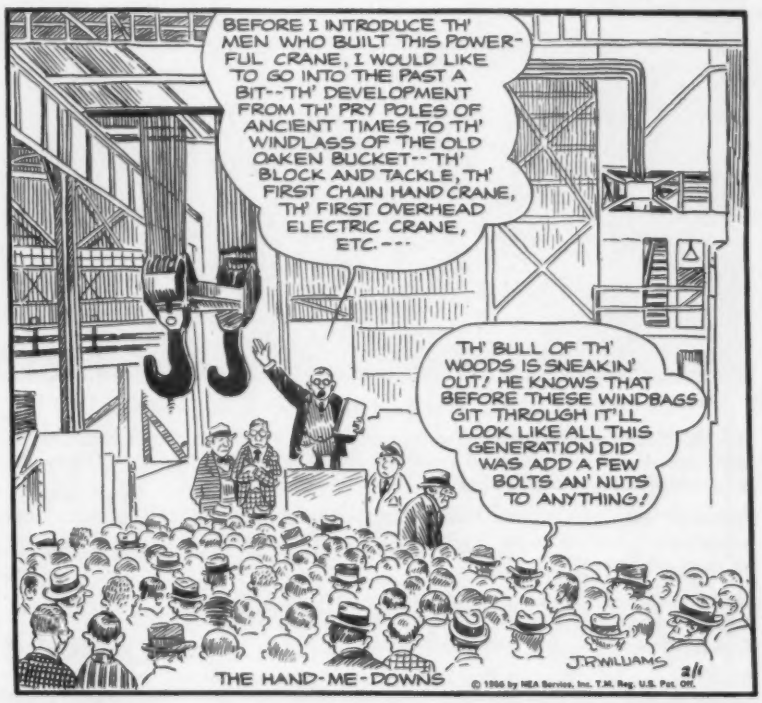
Ford's fight with Chevrolet extends beyond the race to sell more cars, but it isn't getting into a Pike's Peak hassle with Chevrolet at this time.

The feud is between the National Assn. of Stock Car Racing and the United States Auto Club. What it amounts to is this: The Chevrolet climb last year, which everyone should be familiar with from commercial exploitation, was not timed by the USAC but by NASCAR.

Therefore, USAC refuses to recognize the claim that Chevrolet beat the record. Actually, Chevrolet did beat the time set more than 20 years ago by a Ford in 1934 by almost two minutes.

Latest information is that USAC will sponsor a hill climb at Pike's Peak this summer in which all stock cars will be invited to join. It will be the first time that such a trial has been sponsored since way back in 1934.

THE BULL OF THE WOODS — **By J. R. Williams**


BEFORE I INTRODUCE TH' MEN WHO BUILT THIS POWERFUL CRANE, I WOULD LIKE TO GO INTO THE PAST A BIT--TH' DEVELOPMENT FROM TH' PRY POLES OF ANCIENT TIMES TO TH' WINDLASS OF THE OLD OAKEN BUCKET--TH' BLOCK AND TACKLE, TH' FIRST CHAIN HAND CRANE, TH' FIRST OVERHEAD ELECTRIC CRANE, ETC.---
TH' BULL OF TH' WOODS IS SNEAKIN' OUT! HE KNOWS THAT BEFORE THESE WINDBAGS GIT THROUGH IT'LL LOOK LIKE ALL THIS GENERATION DID WAS ADD A FEW BOLTS AN' NUTS TO ANYTHING!
J.R.WILLIAMS
THE HAND-ME-DOWNS
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NEAT WAY TO PLAY SAFE: JAL-TREAD FLOOR PLATE

Jal-Tread floor plate combines the strength and durability of high quality steel with a neat, distinctive checkerboard pattern scientifically designed for *safety*.

Whatever your application . . . in new construction . . . new equipment . . . or replacement jobs, Jal-Tread will assure you of these advantages:

Safe Footing—300 miniature squares per square foot—all of uniform height—provide maximum linear friction surface that protects you against lost-time accidents.

Easy Fabrication—The Jal-Tread straight line pattern simplifies welding, flanging, shearing, bending, punching, and drilling operations. Experience shows that Jal-Tread can be cold-formed on standard plate bending machines.

Easy Cleaning—The Jal-Tread straight line gutter pattern permits quick, thorough sweeping and draining in any direction.

For safe, long-lasting flooring always specify J&L Jal-Tread . . . *it's available at leading distributors everywhere.*

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

see our catalog in Sweet's ARCHITECTURAL FILE or write for copy

Why Mergers Will Be More Difficult

Plight of small companies still bothers Administration . . . And election year adds steam to trust curbing . . . See new bills calling for more merger preliminaries, blocking some unions—By G. H. Baker.

◆ WASHINGTON is going to get a lot tougher about enforcing the antitrust laws in the months ahead.

The souped-up drive against any business mergers that look suspicious to the government is being sparked by several different motives:

1. An honest concern on the part of the Eisenhower Administration and the Congress over the dwindling number of smaller firms in the United States. (Fewer and fewer companies are producing more goods, and the trend seems to be accelerating.)

2. An election-year tendency on the part of politicians to holler up some real or fancied dangers threatening small business from any direction.

3. The realization that uncontrolled monopolies will eventually cause serious injury to consumers through high, rigid prices.

Congress Will Act . . . As a result, you can expect Congress to write a few new antitrust laws this year. The political climate is favorable. Here are some of the legislative proposals that shape up as likely candidates for enactment into law:

An Administration proposal requiring that firms proposing to merge notify the government well in advance of the effective date of the merger.

Another Administration bill which would permit the government to go to court to block any mergers it views with alarm. If the mergers have already been consummated, the government could then force divestiture.

Seek Speed-up . . . Businessmen who try to inject efficiency into government programs very often find themselves in trouble. This is because "efficiency" almost always means doing the same work with fewer people, and patronage-hungry politicians crave bigger—not smaller—empires.

Charlie Wilson, the Secretary of Defense, is the latest Cabinet member to experience frustration over his attempts to "clean up" the Defense Dept.

Mr. Wilson, with President Eisenhower's backing, has proposed to Congress that the government step out of a long list of manufacturing and commercial activities (paint-making, auto repair, rope-making, coffee-roasting, for example) and sell these shops to private enterprise.

But Many Moan . . . Getting the government out of business is far easier said than done. Almost every congressman has some kind of government enterprise in his home district, along with thousands of civil service employees—all of whom want to keep the party going. Congress barked at Wilson to stop these sales. Close up something in some other states—not in mine, they chorused.

Charlie has a broad back, and he can take it. He probably won't resign over this incident, although many a thinner-skinned government official has left Washington in disillusionment and dismay.

U. S. Consults Industry

● The Eisenhower Administration's growing interest in mobilizing industry for emergency purposes is showing up in the significant gains in industry advisory committees in recent weeks.

The Department of the Interior, for example, has organized a total of 14 industry committees to advise the government on metals and minerals production. An iron ore committee is included in the latest batch of committees to be established.

To get a better cross-section, most committees are larger (average: 13 members each) than formerly.

First with NEW "Automatic" Service

Cone was the first builder of multiple spindle automatics to provide machine users with an experimental service in the application of carbide tools.

This service is a practical means of determining the possibilities of carbide tools for production men without loss or interference with their regular production schedules.

A pamphlet "FOUR STEPS WITH CONE" describes this service. Send for your free copy.

Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

Boom:

Solid business position shown by '55 profit figures.

Solid earnings position of U. S. manufacturers is shown in new Federal Trade Commission figures pointing to a record after-tax profit of $10.9 billion in the first nine months of 1955.

This income was 34 pct higher than that for corresponding months of 1954. It was derived from sales amounting to $204.8 billion, another record high for the January-September period. Sales were up 11 pct from those in the first three quarters of 1954.

Net profits after taxes totaled $3.7 billion during the third quarter. Though profits were off somewhat from the $3.9 billion of the second quarter, they topped those in the third quarter 1954 by 41 pct.

Durable Goods

Nearly all major manufacturing lines chalked up sales gains in the months January-September, with durable goods firms leading the way. Primary iron and steel, motor vehicle, and equipment groups made the most notable advances with gains of about 30 pct each.

Durable goods groups also registered sizable rises in after-tax profits, exceeding profits in the first three quarters of 1954 by 43 pct. Iron and steel, primary nonferrous metals, and motor vehicle and equipment producers earned after-tax income at an all-time high level.

Estimated assets of all manufacturing corporations grew by $5.7 billion in the third quarter to reach a new peak of $184.5 billion on Sept. 30. Inventories over the quarter were higher by $600 million. Net working capital advanced to a record $63 billion, compared with $61.6 billion at the end of June.

Find More Firms

Business population of the country increased by 45,000 firms during the first half of last year, reaching 4,225,000 operating concerns as of July 1,

The increase, somewhat larger than usual for the period, was distributed among each division of industry except manufacturing, which remained unchanged. Largest relative gain of about 3½ pct came in contract construction firms as the construction boom hit its peak. Population of each of the other major categories of industry increased about 1 pct.

Some 210,000 new businesses were formed in the first six months of 1955, some 21,000 more than the same period in 1954. At the same time, the number of firms discontinuing operations in the first six months of last year was lower than in the same period of 1954.

Atoms:

AEC issues rules for new nuclear plants.

New rules to permit industry to build and run nuclear reactors and plants for producing and processing atomic fuels under government license take effect on Feb. 18.

Atomic Energy Commission, which publishes the licensing rules, has also issued a new regulation to help U. S. firms and individuals engage in unclassified atomic energy business abroad. This regulation becomes effective immediately.

The rules for domestic nuclear energy plants, entitled "Licensing of Production and Utilization Facilities," provide for "class 103" and "class 104" licenses.

Permit Comes First

Class 103 will be issued in connection with facilities of industrial and commercial nature. Class 104 licenses will apply to reactors used in medical therapy or in research and development.

Before AEC grants a facilities license, which may be good for as much as 40 years, it will issue a construction permit to the applicant. At this point the agency will on request allocate a quantity of nuclear material for the new facility.

Special safeguards for plant employees and the public must be listed by the applying firm in its application for a facilities license. License requests for 15 facilities of three types have been filed with AEC, but licenses have been issued for only two private research reactors, both in operation.

The foreign activities regulation includes a reporting requirement covering specified operations. It does not authorize activities in Russian-bloc countries.

Pentagon Ponders Missile Threat

• Evidently, there's some real concern in Washington over recent advances made by the Russians in perfecting long-distance guided missiles. Nobody in government is willing to talk publicly on the subject. But a whole rash of closed-door meetings has broken out at the Capitol, at the White House, and at the Pentagon. Defense Secretary Charles E. Wilson seems to be doing a lot of the explaining, although he declines flatly to disclose just what the U. S. has learned that's causing so much concern.

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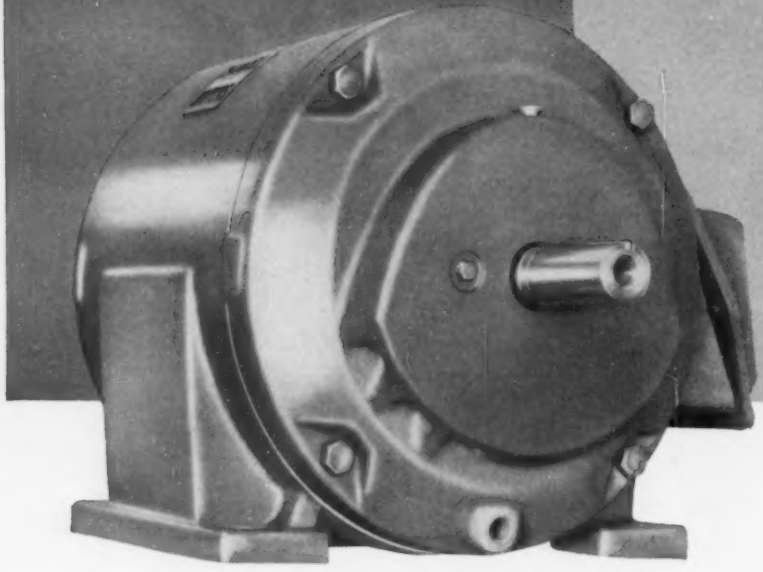

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New Aircraft Orders Still Climbing

West Coast planemakers' $7 billion order backlog should mount even higher this year . . . Missile deliveries hitting record peak . . . Aircraft builders push jet market drive . . . Boost plant facilities—By *R. R. Kay.*

◆ ARE YOU cashing in on the West Coast aircraft boom? If you're bug-eyed now over the $7 billion planemakers' backlog here, you haven't seen anything yet!

With the year hardly off the ground, military and commercial orders are barreling in. Commercial orders are getting headlines, but the big business, some 85 pct, is still for military planes.

Also, the industry here is delivering guided missiles of all types at the highest rate ever. And the new Federal Budget earmarks a healthy increase for these weapons.

Aircraft manufacturers' 1956 earnings should hold close to record highs.

More Foreign Orders . . . As predicted in this column, foreign commercial orders are now coming in fast and furious. Since most U. S. airline orders for jet transports are safely in the till, West Coast planemakers are beefing up their foreign sales forces in a titanic struggle to capture the world market.

Q. What percentage of U. S. big transports are made on the West Coast? A. 100 pct. Q. What percentage of U. S. military planes are made here? A. 50 pct.

Plane Plants Buzzing . . . Plants from Seattle to San Diego are buzzing with big plans to add needed space for building the huge new airliners. Douglas Aircraft Co. alone will spend $25 million to construct DC-8 jet facilities at Long Beach, Calif.

Seattle's Boeing Airplane Co. tacked on a tidy $248 million order to its $2 billion backlog. It's for B-52's, probably the largest single U. S. Air Force order for long-range jet bombers.

Boeing is taking orders for a larger, longer-range version of its jet transport, the 707 Stratoliner. The new ship, the Intercontinental, will carry 145 tourist-class passengers or 124 first-class. Range: over 4000 miles. Orders are in from Air France and SABENA-Belgian World Airlines.

Big Orders Abound . . . And in San Diego, Convair Div. of General Dynamics Corp., got this good news: a "substantial USAF production order"—bigger than all previous orders put together—for supersonic delta-wing F-102A and TF-102A jet fighters and trainers.

New buyers this year for Convair's twin-engine Metropolitan airliner: Braniff International Airways, Royal Australian Air Force, and the Italian international airline, Alitalia.

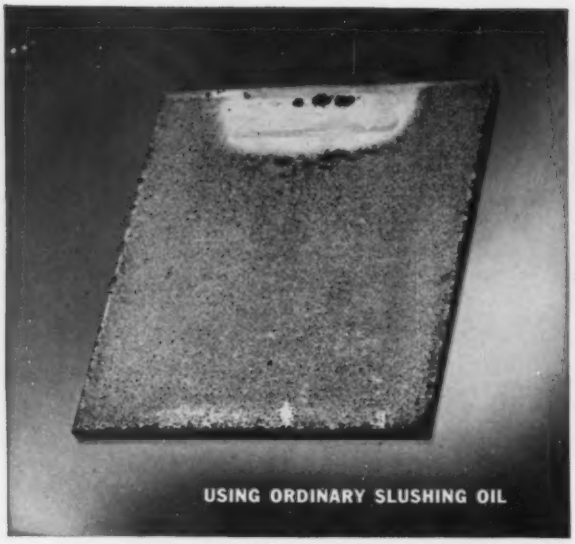
El Segundo (Calif.) Div. of Douglas Aircraft Co. has another year's work on the U. S. Navy's Skyraider series. New contract calls for an advanced version of the carrier-based attack bomber.

Douglas wound up 1955 with orders for 328 commercial planes to cost $1 billion.

Lockheed Aircraft's year-end tally: $335 million for 177 planes of four types for 17 world airlines. This means jobs for a big work force for a long time.

West's aircraft producers, and their salesmen, have had one of their best years, assuring good things to come through 1956.

PRODUCTION LINES at Douglas Aircraft are busy turning out commercial airliners. Coming down the assembly line at the Santa Monica, Calif., plant are a DC-7, left, and DC-6A's, headed for nation's airlines.



Humidity Cabinet Test proves superiority of new coating oil. Using ordinary slushing oil, steel test panel (on left) shows harmful rust after only 100 hours in humidity cabinet with relative humidity of 100% at 120 F. An identical steel test panel (above right), protected by new Sunkote A, shows no rust or stain whatsoever after 200 hours under same rust test conditions of high humidity and temperature.

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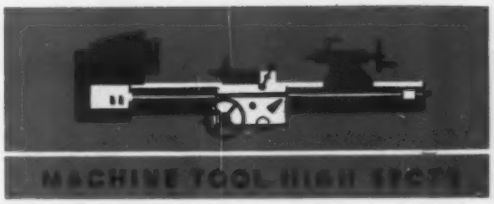


Tool Reserve Switch Stirs Probe

Lawmakers want clarification of release move . . . Senate group to hear views of builders . . . Hearings will cover past use of funds, checks against duplicate buying by services—By *E. J. Egan, Jr.*

◆ MACHINE tool industry will give its views next week on how the Government can best prevent another shortage of metalworking equipment in case of war.

A Senate Small Business subcommittee, headed by Sen. Edward J. Thye, R., Minn., will hold hearings in Washington, Feb. 7 and 8, on government machine tool mobilization plans.

Builders were startled last month when the Office of Defense Mobilization and the Defense Dept. decided that war-reserve tools could be loaned out for emergency use in current military production. Biggest concern among the men that make the tools is that "borrowed" equipment will never find its way back into the reserve pool.

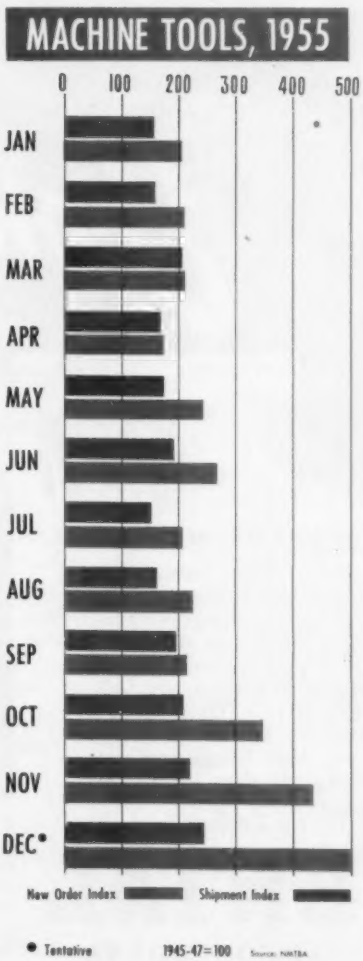
Deny Order Gripe . . . Next week's hearing, investigators say, will not be a gripe session by builders who fear a loss of new business. As mentioned elsewhere in this same column, the industry is snowed under with new orders.

They are going to call in Dr. Arthur Flemming, Director of Defense Mobilization, and Reuben B. Robertson, Jr., Deputy Secretary of Defense, to explain the new program and why it was adopted.

What They Want . . . Sen. Sparkman feels that the ODM-DOD decision is a major shift in the Government's program of maintaining ample machine tool reserves, both for mobilization preparedness and to guarantee a healthy machine tool industry.

He says, "Our committee cannot be sure that the general policy has been changed, since the announcement was so vague.

Another government witness will be Harold S. Vance, former chairman of the Advisory Committee on Production Equipment. The Committee in 1953 urged that the government spend between $500 and $800 million annually to have plenty of tools and production capacity on hand. But the new policy, investigators say, "indicates that Mr. Vance was consulted and did concur in what is apparently an about-face from the original recommendations.



Seek Fund Check . . . Government witnesses at next week's hearings will also be asked about the Pentagon's use of the $200 million voted by Congress for reserve tool buying in fiscal 1955 and 1956; also how the Defense Dept. checks on the three military services to make sure their tool purchases are not only adequate, but do not duplicate one another.

Spokesmen for the machine tool industry at these sessions will include Swan E. Bergstrom, chairman of the Permanent Defense Subcommittee of the National Machine Tool Builders' Assn. and vice president of the Cincinnati Milling Machine Co.; also R. A. Vidinghoff, chairman of the Government Relations Committee of the American Machine Tool Distributors' Assn.

But, shocked as it may have been by the Government's change of plans, the machine tool industry was pleasantly surprised last week to learn that it wound up the 1955 business year with a new-order blaze of glory.

New orders for metal cutting machine tools in the month of December are estimated at $157 million. That's well up from November's $128 million (previous high for the year) and even more impressive when matched with the December 1954, $60 million.

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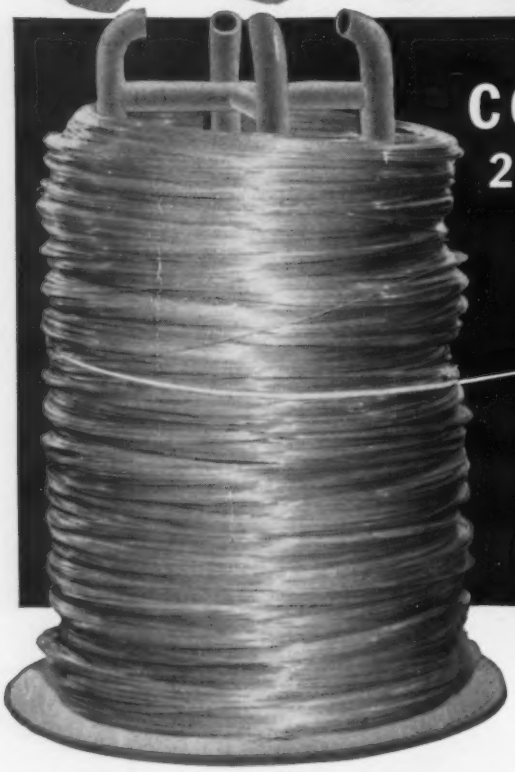

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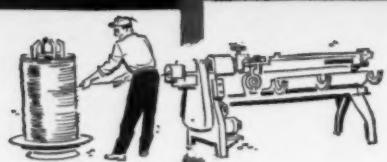

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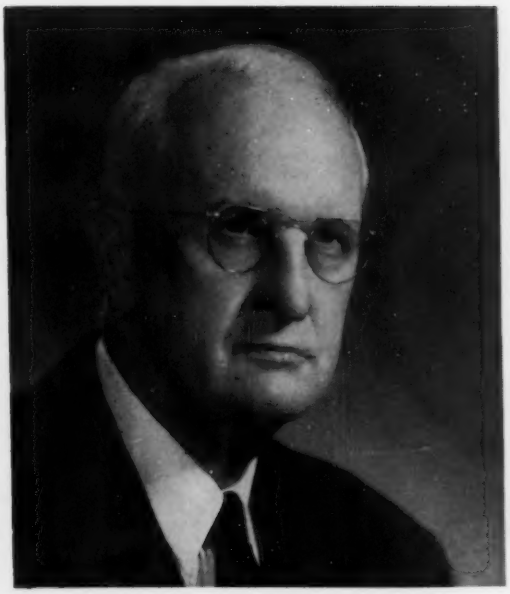

The Iron Age

SALUTES

Earle C. Smith

His career shows how a man can gain the theoretical knowledge for modern manufacturing without losing touch with practical things. His manner shows you can be both successful and modest.

One of the big problems in modern manufacturing is to find men with both practical experience and theoretical knowledge. Republic Steel's Earle Smith showed an understanding of this problem long before technical progress made the need clear and urgent.

Chief metallurgist at Republic, Mr. Smith is a friendly, relaxed man who spent his early years alternating between metallurgical studies and a series of rugged practical jobs. After graduating with letters in football and track and a degree as engineer of mines, he joined a construction gang in Yellowstone. Then he returned to Ohio State as graduate assistant in metallurgy. His work in the last post led to his being enrolled in 1913 as the first graduate student in microscopic minerology.

Following this, he worked two years for U. S. Steel as third helper at the openhearth furnace, receiving 17¢ an hour and working a 12-hour day. He spent a brief period in graduate study at Columbia, then returned to Ohio State to teach metallography and gas analysis. During the next summer term at Columbia, he developed principles for the coils and tubes of battleship oil burners.

In 1917, he went to Portsmouth Steel to work on steel shells, then to Peerless Motor Co. as a laborer in heat treatment. Following this, the Signal Corps sent him to Central Steel to organize inspection crews.

At the end of the war, he returned to Central Steel as chief inspector. He moved steadily up the line and when Central merged with Republic, he became assistant district manager of the division. In 1932, he was appointed chief metallurgist of Republic.

The numerous honors accorded Mr. Smith for his work in metallurgy include the gold medal, American Society for Metals; Lamme Medal, Ohio State University; and the Institute Medal, American Iron and Steel Institute. Despite high professional and company standing, he remains modest and easy to approach.

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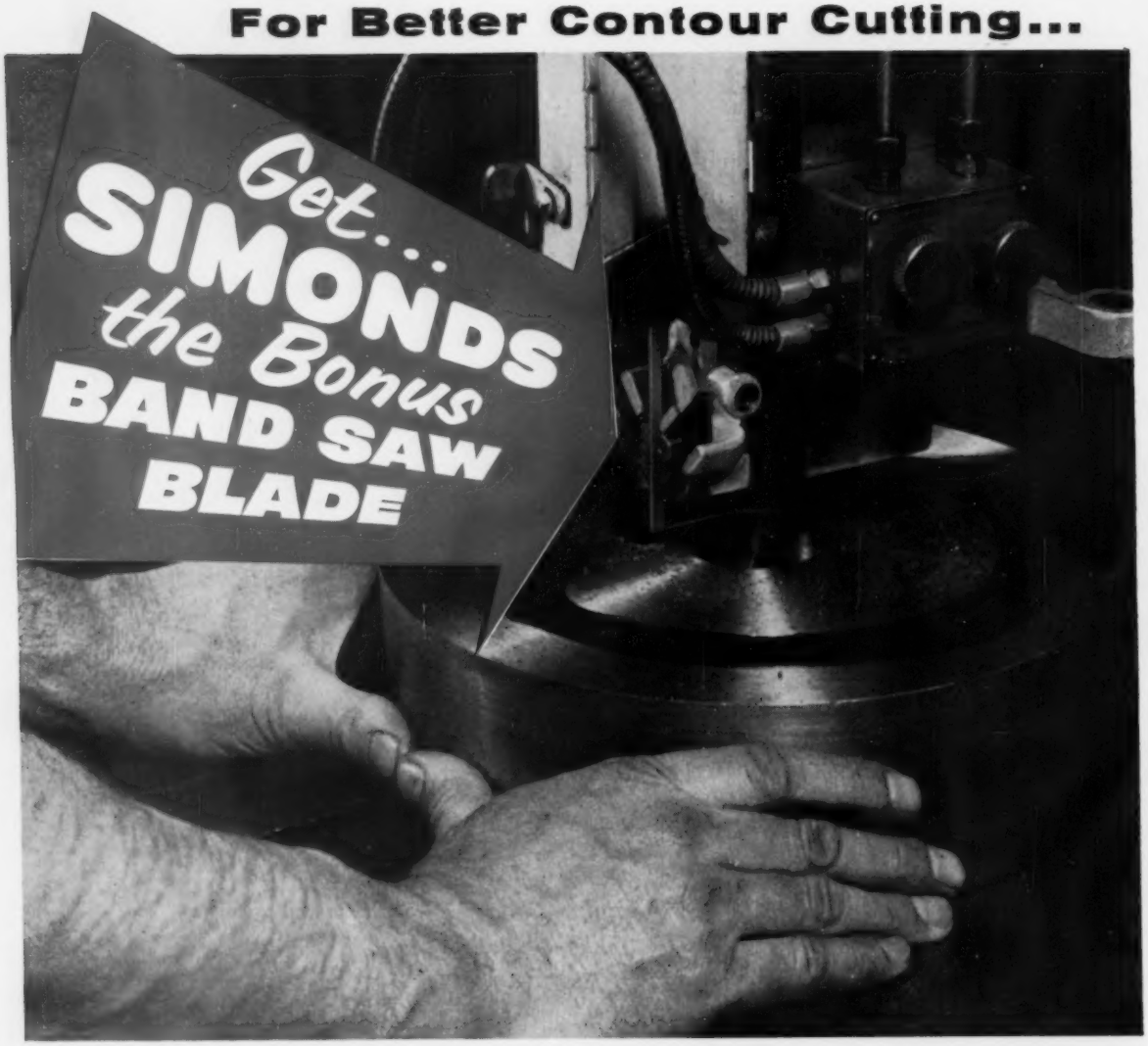

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The Iron Age INTRODUCES

ELSTON J. TRIBBLE, elected vice president, Worthington Corp., New York.

Robert R. Coombs, elected vice president, **Valley Mould & Iron Corp.,** Hubbard, O.; **Kenneth H. Olson,** appointed manager, Service Dept.; **Floyd D. Hunter,** elected secretary-treasurer.

Walter E. Benoit, named executive assistant to manager, Baltimore Div., **Westinghouse Electric Corp.,** Baltimore, Md.

C. V. Blackburn, elected executive assistant to president, **Stran-Steel Corp.,** Detroit.

Elmer L. Casey, elected executive vice president, **M. H. Treadwell Co., Inc.,** New York.

James D. Russell, appointed vice president and general manager, **Young Bros. Co.,** Cleveland.

John L. Schlafhauser, appointed treasurer, **Shaw-Perkins Mfg. Co.,** Pittsburgh.

Paul R. Morow appointed assistant superintendent, Steel Producing Div., **U. S. Steel Corp.,** Morrisville, Pa.

John W. Vaughan, appointed assistant to vice president, Alloy Metal Div., **Alter Co.,** Davenport, Iowa.

William W. Holloway, Jr., and **Clarence D. Thurnes,** appointed assistant superintendents, Tube Dept., **Wheeling Steel Corp.,** Wheeling, W. **Va.**

Edward E. Helm, elected vice president and general manager, **Reliance Electric & Engineering Co.,** Cleveland; **Charles R. Sutherland,** elected controller.

Thomas E. Moffitt, elected executive vice president, **Hooker Electrochemical Co.,** Niagara Falls, N. Y.; **R. Wolcott Hooker,** elected senior vice president.

J. W. MacKay, elected vice president, sales, and secretary, **American Cast Iron Pipe Co.,** Birmingham; **James B. Hill,** appointed assistant sales manager.

Leonard S. Ham, appointed superintendent, Hot Strip Dept., **Granite City Steel Co.,** Granite City, Ill.; **Clarence R. Mitchell,** appointed divisional superintendent, Rolling Mills; **Bert D. Houston,** appointed assistant superintendent, Hot Strip Dept.

George H. Denny, appointed manager, sales, Pacific Coast office, **Mallory-Sharon Titanium Corp.,** Hollywood, Calif.; **Andrew N. Eshman,** appointed service engineer.

Lawrence C. Gaunt, appointed sales manager, **The O. K. Tool Co., Inc.,** Milford, N. H.

Louis W. Jander, named general sales manager, Henry Disston Div., **H. K. Porter Co., Inc.,** Philadelphia; **Walter H. Gebhart,** named consultant.

A. M. TULLO, appointed vice president, Worthington Corp., Harrison, N. J.

LAWRENCE M. LIGGETT, appointed manager, research, Speer Carbon Co., St. Marys, Pa.

EDWIN C. McDONALD, appointed chief combustion engineer, Republic Steel Corp., Cleveland.

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Charles T. Tinsley, appointed assistant sales manager, Industrial Rubber Div., **Thermoid Co.,** Trenton, N. J.

J. W. Kiddy, appointed manager, Rotary Drill & Tool Div., **Davey Compressor Co.,** Kent, O.

A. Clark Daugherty, named assistant to president, **Rockwell Mfg. Co.,** Pittsburgh.

A. F. Tydeman, named director, purchasing **Kropp Forge Co.,** Chicago.

H. M. Hood, named manager, **Goodyear Tire & Rubber Co.,** Cali, Columbia.

Willis J. Keenan, appointed district sales manager, **Republic Steel Corp.,** New York. New district sales managers are: **Leonard D. Woods,** Los Angeles; **Vincent D. Shewell,** Birmingham, Ala.; **Jack D. Cavan,** San Francisco; **George E. Lustic,** Detroit; **Richard E. Wagner,** Cleveland; **Thomas F. West,** Chicago.

Martin Vander Laan, appointed manager, operations, Engineering Div., **Hewitt-Robins, Inc.,** New York.

John E. Newlin, Jr., appointed manager, tool steel sales, **The Carpenter Steel Co.,** Reading, Pa.

Ira Hayes, appointed chief chemist, **Rheem Automotive Co.,** Los Angeles; **Dale F. Mason,** appointed technical control manager.

William K. Hopper, appointed manager, **Republic Etched Products, Inc.,** Conn.

Blair T. Martin, appointed assistant sales manager, **Perfect Circle Corp.,** Hagerstown, Ind.

Joseph T. Vinbury, appointed sales manager, **Abrasive Machine Tool Co.,** East Providence, R. I.

EUGENE M. EHRBAR, appointed midwest district sales manager, Steel and Tubes Div., Republic Steel Corp., Chicago.

WILLIAM A. BROWN, JR., appointed general manager, Alemite and Instrument Div., Stewart-Warner Corp., Chicago.

HERBERT KUNZEL, elected president, Solar Aircraft Co., San Diego, Calif.

EDMUND T. PRICE, elected chairman, Solar Aircraft Co., San Diego, Calif.

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. . . Albion's pearlitic malleable irons afford unusually fine wear resistance with excellent bearing properties. Maximum rigidity and prolonged fatigue life offers outstanding endurance. Yield strength comparable to steel forgings.

. . . Albion's pearlitic malleable irons have a fine, uniform grain structure that machines easily and accurately with exceptional mirror-smooth finishing qualities. Extremely adaptable to localized hardening for specific needs.

Contact the Albion Malleable Iron Company now . . . they'll be glad to show you how many ways Albion's pearlitic irons can save you time, tools and dollars.

Remember . . . Albion's Research and Development Laboratory facilities and competent engineering staff are ready to help you design better products that can be made at lower cost.

ALBION MALLEABLE IRON CO.
Albion, Michigan

PERSONNEL

Rudolph Hallberg, named general manager, **Lovequist Engineering Co.,** Los Angeles.

Edward G. McGlinchy, appointed manager, plumbing brass goods sales, **Waterbury Manufacturing Co.,** Waterbury, Conn.

D. J. Lillibridge appointed district sales manager, Detroit area, **Chicago Tramrail Corp.,** Chicago.

Edward C. Davidson, appointed Eastern regional sales manager, Frit and Glaze Div., **Ferro Corp.,** Cleveland.

George H. Gough, appointed assistant product manager, forgings, **Kaiser Aluminum & Chemical Sales, Inc.,** Chicago; **Fred Lohse,** appointed technical assistant to manager, Chemicals Div., Oakland, Calif.

C. G. Gehringer, appointed manager, Scale Div., **Fairbanks, Morse & Co.,** Chicago.

John K. Oliver, appointed manager, Electrical Div., **Wagner Electric Corp.,** St. Louis, Mo.

Eugene B. Kovats, named mid-Eastern district sales manager, Gerrard Steel Strapping Div., **U. S. Steel Corp.,** McKees Rocks, Pa.

William E. Parfitt and **M. N. Ornitz,** appointed divisional managers, **Blaw-Knox Co.,** Pittsburgh.

M. J. Drackett, appointed sales manager, attachments section, Industrial Truck Div., **Clark Equipment Co.,** Battle Creek, Mich.

Melvin E. Kramer, appointed general manager, warehouse operations, **Dumas Steel Corp.,** Pittsburgh.

E. Mark Nease, appointed director, purchases, **Pittsburgh Screw & Bolt Corp.,** Pittsburgh.

W. Laird Davis, appointed manager, pig iron sales, **The Shenango Furnace Co.,** Pittsburgh.

Former Heat-Treating Time—28¼ HOURS
TOCCO Heat-Treating Time—30 MINUTES

Plus

$108 saved on every mill roll

This special mill roll hardening fixture is powered by two 200 KW, 3000 cycle TOCCO machines. Mill roll shown is 12" diameter by approx. 60" long.

with TOCCO* Induction Heating

When progressive engineers at The McKay Machine Company switched from conventional heat-treating methods to TOCCO induction hardening of their mill rolls, they achieved not only increased production but also important cost savings, and perhaps most important of all, a greatly improved product.

56 Times as Fast!

Formerly mill rolls required a 12-hour heat, a 15-minute salt brine quench, 12 hours tempering and a 4-hour cooling period. With TOCCO the whole job is done—and done better—in just 30 minutes—56 times as fast!

Here's Real Economy

Reduced furnace time saves $28.00 per roll. More important, grinding time is cut in half (saving $80 per roll) because TOCCO minimizes distortion and there's less stock that must be removed. Runoff used to be as much as ¼"—frequently requiring a separate straightening operation.

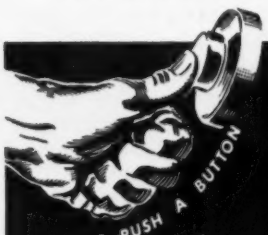
Product Improved

Because TOCCO "scans" the mill roll, i.e. heat treats it progressively, only a small section is at critical temperature at any one time. That's why distortion is minimized and little finish grinding is required. This means that TOCCO-hardened mill rolls have a *more uniform case-hardened depth* than possible with old fashioned methods which in turn means longer life and better performance.

• • •

Why not have a TOCCO engineer survey your plant to determine where TOCCO can reduce your costs, increase production speed and improve product quality?

THE OHIO CRANKSHAFT COMPANY



TOCCO

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. A-2, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

Name_____

Position_____

Company_____

Address_____

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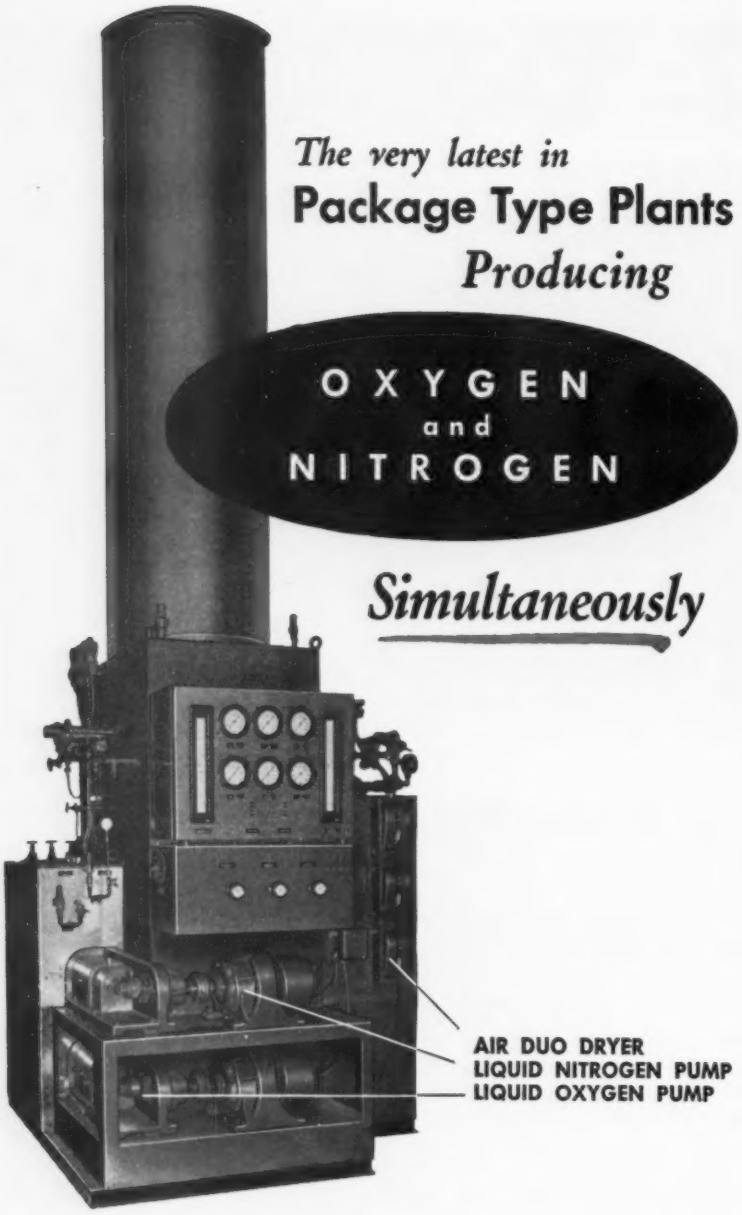
The very latest in

Package Type Plants

Producing

OXYGEN and NITROGEN

Simultaneously



With the introduction of our latest, improved design Package Type Generating Plants, production of high purity Oxygen and Nitrogen simultaneously *increases* production 60% over the production of Oxygen alone, *plus* a corresponding reduction in the *cost* of manufacture. Due to its compact design, a minimum of floor space is required and streamlined panel assembly insures instant visibility of all control gauges. Stock sizes from 1500 to 10,000 cu. ft. per hour. Larger and smaller sizes available. 99.99% Argon available on large size plants.

We invite your inquiry.

INDEPENDENT ENGINEERING COMPANY, Inc.

Manufacturers of

CONSULTING · RESEARCH · DESIGNING

CYLINDERS AND GAS PRODUCING EQUIPMENT
ACETYLENE · OXYGEN · HYDROGEN · NITROGEN

O'FALLON 4, ILLINOIS

Alfred F. Bauer, appointed assistant general manager, Doehler-Jarvis Div., **National Lead Co.,** New York.

E. J. Mercer, appointed general manager, Construction Machinery Div., **Allis-Chalmers Mfg. Co.,** Milwaukee.

Butler Brewen, appointed district sales manager, Detroit, **Metal Carbides Corp.,** Youngstown, O.; **Donald Coats,** appointed sales representative.

James H. Ammerman, appointed Pittsburgh district sales manager, **North American Refractories Co.,** Cleveland, O.

Frank G. Willey, appointed sales manager, **Servo Corp. of America,** Long Island, N. Y.; **Warren Schoonmaker,** appointed sales promotion manager.

L. B. Kuhns and **B. J. Fletcher,** named assistant chief engineers, **Aluminum Co. of America,** Pittsburgh.

Charles O. Morris, appointed assistant manager, pig iron sales, American Steel & Wire Div., **U. S. Steel Corp.,** Cleveland.

Francis A. Diel, appointed New York district sales manager, American Chain Div., **American Chain & Cable Co., Inc.,** New York.

Allen S. Dunbar, appointed manager, Advanced Technical Planning Dept., **Dalmo Victor Co.,** San Carlos, Calif.

Lornts B. Nilsen, appointed chief engineer, **Lewis-Shepard Co.,** Watertown, Mass.

James C. Hunt, appointed application engineer, Switchgear Dept., **Allis-Chalmers Mfg. Co.,** Milwaukee, Wis.; **John S. Ferguson,** appointed application engineer, Heat Transfer & Water Conditioning Dept.; **Leonard H. Sence,** appointed assistant engineer, Centrifugal Pump Dept., **Alvin Shapiro,** appointed research engineer, Mechanical Lab.

NEW!

..LaSalle introduces another quality product!

LARGE HEXAGONS

available NOW! . . in cold-drawn steel bars (GRADE C 1018) . . sizes to 4"

Yes, you can now buy cold-drawn hexagon steel bars in sizes up to and including 4". Effective immediately, LaSalle offers 3¼", 3½", 3¾" and 4" diameter hexagons . . in addition to conventional sizes ranging from ⅛" to 3".

No longer is it necessary to resort to costly and time-consuming forging, milling or other machining to produce large-size hexagons.

And with *cold-drawn* large hexagons you naturally get the superior mechanical qualities inherent in cold-drawn steel bars. Ask your steel distributor for Large Hexagons by LaSalle.

La Salle STEEL CO.

the Most Complete Line of Carbon and Alloy Cold-Finished and Ground and Polished Steel Bars in America.

For additional detailed information, send for your copy of this helpful new data sheet, "Large Hexagons."

LA SALLE STEEL COMPANY
1436 150th Street
Hammond, Indiana

Please send me Helpful Data Bulletin No. 14 "Large Hexagons"

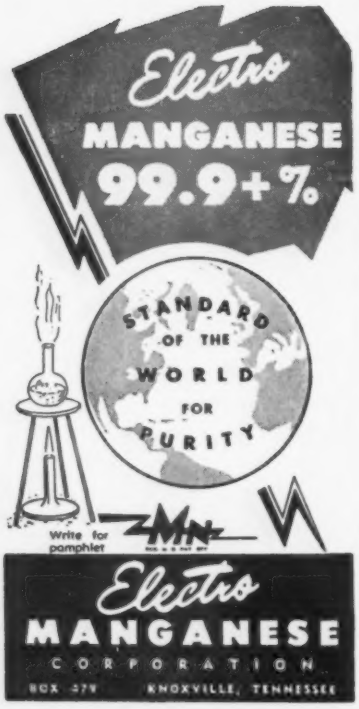
Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____



STAMPINGS
for the FINISHED
PRODUCT

SEE SESSIONS . . . for Metal Specialties, Box & Case Hardware, Stamped Assemblies in a wide range of finishes.

J. H. SESSIONS & SON

290 RIVERSIDE AVENUE • BRISTOL, CONN.

FABRICATING: Bolts Bettered

Tensile strengths to 200,000 psi and resistance to fatigue or shock loading given new tension bolts . . . Units may lead to space, weight savings in fasteners.

New tension bolts with tensile strengths of 180,000-200,000 psi and exceptional resistance to dynamic fatigue or shock loading are reported to pave the way for savings of space and weight in both fasteners and connected parts.

These 12-point, external wrenching bolts—named EWB-18 by the manufacturer, Standard Pressed Steel Co., Jenkintown, Pa.—are now in production for several airframe fabricators.

Saves Space, Weight

Design and fabrication innovations—particularly those which endow the EWB-18 with unusual fatigue strength—are said by the manufacturers to pave the way now for development of a series of super bolts of similar design with tensile strengths ranging well above 200,000 psi.

Though the EWB-18 may be used initially in size-for-size substitution for present-day bolts to beef up structural assemblies, its major advantage—the saving of space and weight—will probably result from new designs built around the fastener.

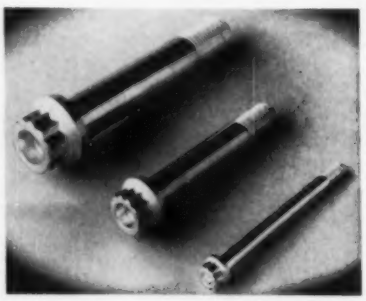
Endurance Limit High

Higher tensile strength of the EWB-18 may permit reduction in the size or number of bolts needed for a given job. The savings can be considerable, since not only the weight of the bolt, itself, but also the size and weight of the connected parts can be reduced through use of the smaller, stronger fastener.

A measure of EWB-18 fatigue performance is its endurance limit—that is, the maximum load that can be sustained repeatedly without failure. Endurance limit of the EWB-18 ranges from 50,000-60,000 psi, as compared to 40,000 psi for 160,000-psi steel fasteners.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 129. Just indicate the page on which it appears. Be sure to note exactly the information wanted.



Aircraft frame bolts combine strength, fatigue resistance.

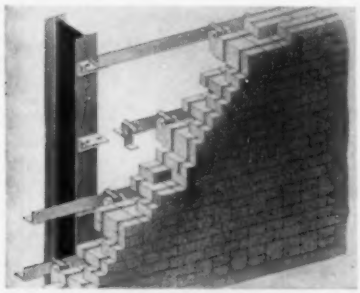
Refractories:

New modular suspended wall developed.

The advantages of suspended walls for heating furnaces reportedly lies in the fact that the weight of the refractories is transferred to a supporting metal framework, thus automatically raising the softening point of the refractories.

A new modular suspended wall, developed by the George P. Reintjes Co., Kansas City, is designed for slab and billet heating furnaces in the steel mills, as well as for use in boilers.

The refractories, with the exception of the supporting tiles, are 2½ in. x 4½ in. x 9 in. in size. The individual tiles are locked together by tongues and grooves. Every other course is a header course laid in what is known as the English Bond. The walls are laid in



Small refractory shapes make up wall for slab, billet furnaces.

the same type of high temperature mortar that has been used to absorb the expansion of the refractories.

This modular wall, it is stated, can be insulated, built within the steel casing and supported from existing buck stays with a minimum of structural change.

Metals:

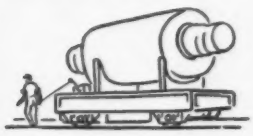
Pure rare earth oxides now available.

Pure rare earth oxides are being produced in commercial quantities by the Research Laboratories of Colorado, Inc., Newtown, Ohio. The entire rare earth spectrum is produced in purities ranging from 99 to 99.98 pct, with lower purity materials available on demand.

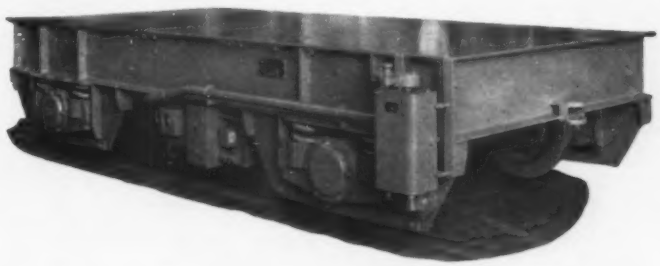
The entire process is adapted from that developed at the Institute of Atomic Research in Ames, Iowa, for AEC production of rare earths. The installation adapts the research experience gained at Ames to provide the first plant capable of sustained production of high purity heavy rare earths for industry and academic research establishments.

Currently available are lutecium, ytterbium, thulium, erbium, holmium, dysprosium, yttrium, terbium, gadolinium, europium, samarium, neodymium, praseo-

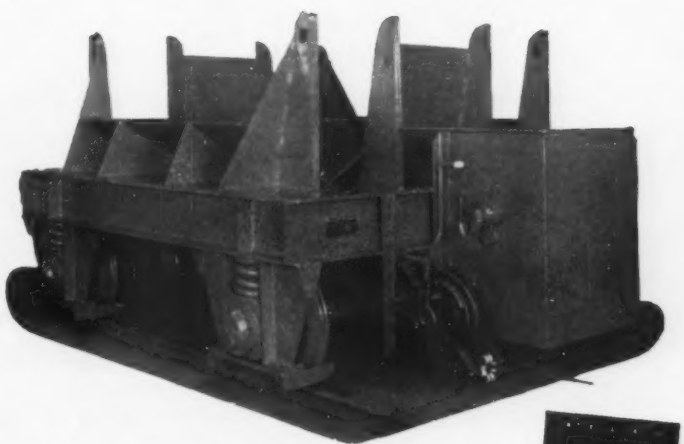
TRANSFER IT SAFELY *at Less Cost with* ATLAS



Atlas Safety-Type Transfer Cars are outstanding for moving heavy materials over short distances. Designed for storage battery, diesel or gas-electric, or cable reel service. Only one simplified control lever for safety. The car moves only when the operator holds the lever.



50-TON STORAGE BATTERY FLAT CAR



64-TON ELECTRIC FLAT CAR

Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

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WILLSON ***Contour-Spec***® **gives you "wrap-around" protection and comfort!**

Patented hinged bridge, exclusive with Willson, permits *comfortable* and *complete* closure around eye cavity.

Willson Contour-Specs actually wrap around the wearer's face. This permits the comfortable plastic nose and cheek pads and the round molded cushion on the side shields to make gentle, comfortable *contact all around!* Actually, Willson Contour-Specs combine the all-around protection of cup goggles with the lightweight comfort of safety spectacles.

It is the Willson Research Center . . . that brings you this advance in safety spectacle design—along with its complete line of more than 50 styles of safety spectacles to meet every eye protection requirement.

Write today for your new Willson catalog of eye, respiratory and head protection equipment, and—in the meantime—ask your Willson distributor to show you the unique Willson Contour-Spec.

WILLSON
231 Washington Street,

Over 300 Safety products carry this famous trademark

PRODUCTS, INC.
Reading, Pennsylvania

dymium, cerium and lanthanum. Europium and lanthanum are provided on special order only.

Maintenance:

New penetratent speeds loosening fittings.

Designed for speed in loosening frozen fittings, nuts, bolts and sheaves, a new penetrating formulation is available in a spray dispenser can. The pressurized container makes it possible for mechanics to carry penetrating oil in their tool boxes without the danger of spillage. The high pressure stream also gives the advantage of ease of application in difficult positions such as overhead, or on distant points, for the stream will actually shoot 4 ft in any direction.

Pressurized container gives application ease, no spill.

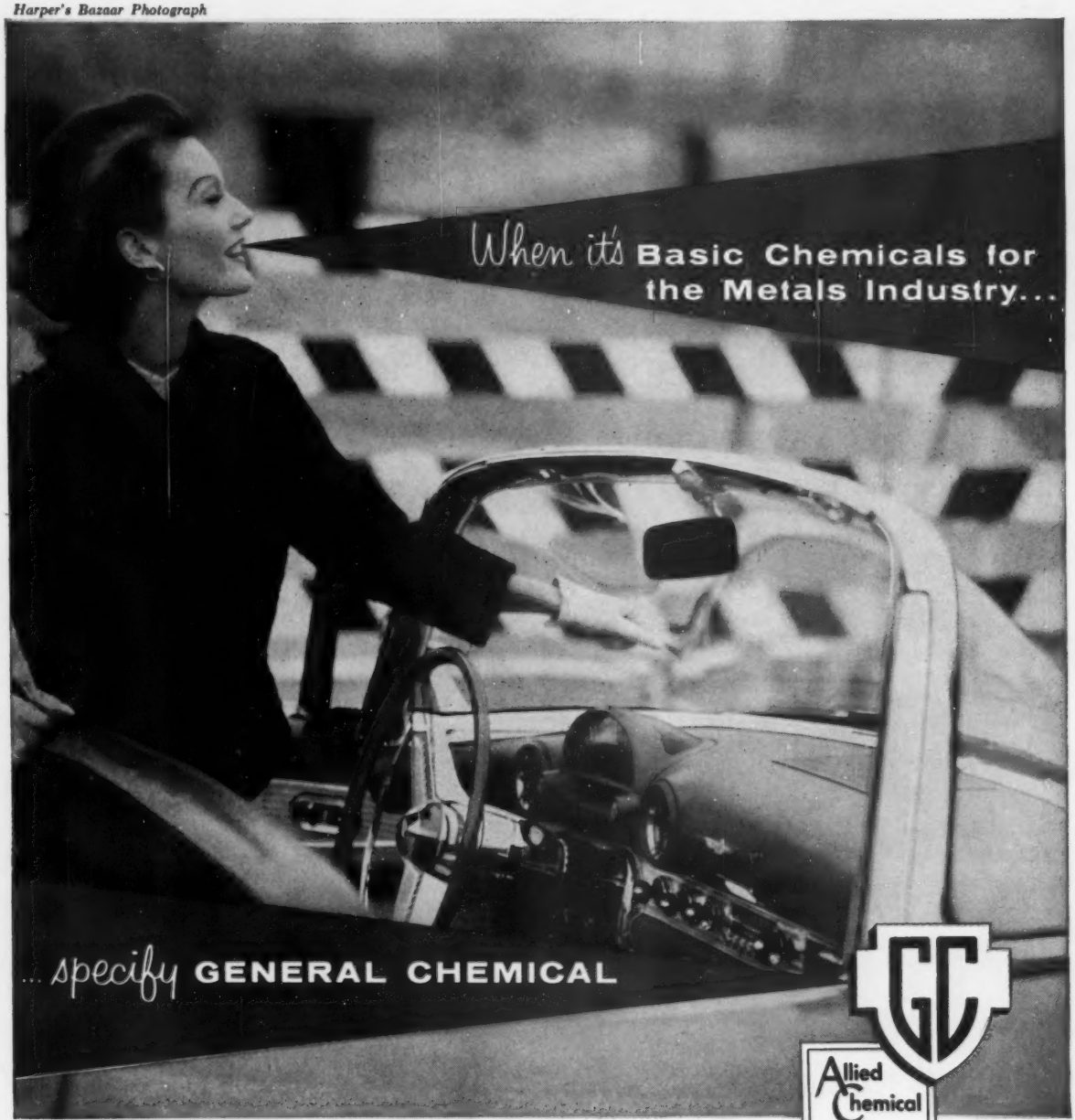
The addition of molybdenum disulfide to the other highly active penetrants produces a product which both loosens and lubricates even under extreme conditions. It reportedly will not squeeze out of threads or evaporate from hot surfaces because the molybdenum disulfide lubricates everything it touches with a film that heat or pressure will not destroy. This Nu-Aero Penetrating Oil is manufactured by Pressure Products Co., West Chester, Pa.

Hardfacing:

Alloy material designed to resist heat, corrosion.

A nickel-chromium-boron-tungsten hardfacing material designed to provide parts exposed to

Harper's Bazaar Photograph



Sulfuric Acid
Hydrochloric (Muriatic) Acid
Nitric Acid
Hydrofluoric Acid
Sodium Fluoride
Sodium Bifluoride
Trisodium Phosphate
Sodium Metasilicate
Oxalic Acid
Fluoboric Acid
Potassium Fluoborate

Sodium Fluoborate
Ammonium Fluoborate
Lead Fluoborate
Tin Fluoborate
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Iron Fluoborate
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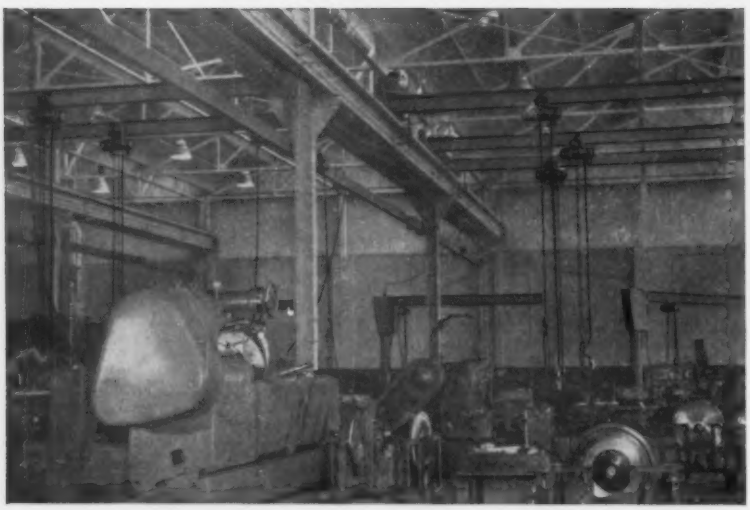
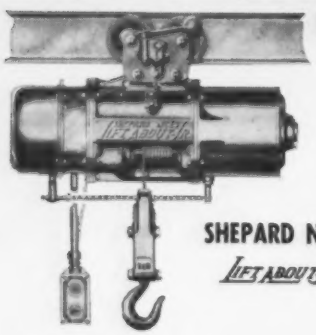
SHEPARD NILES

LIFT ABOUT-Jr.

EASES WORK

. . . on your production line



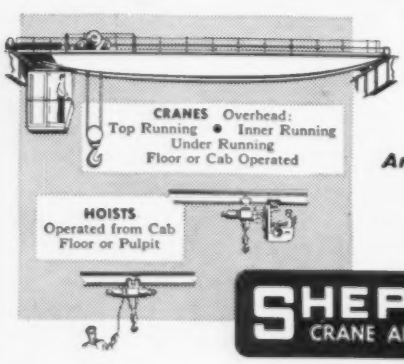


KEEP PRODUCTION on the move

. . . with a Shepard Niles Liftabout-Jr. This husky, light-service hoist does all your back-breaking lifting . . . enables one man or woman to move more material at lower cost.

Low in cost, the Liftabout-Jr. features dependable wire rope hoisting. Available in 250, 500, 1000 or 2000 lb. capacities . . . parallel or cross-mounted with bolt, hook or trolley suspension.

SHEPARD NILES LIFT ABOUT-Jr.



• Write for latest Liftabout-Jr. Bulletin . . . and ask to have a Shepard Niles representative call.

America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION

1478 Schuyler Ave., Montour Falls, N.Y.

extreme conditions of vibration and/or heat with a wearproof, corrosion-resistant surface is now available.

Named Colmonoy No. 70, the new alloy, developed by Wall Colmonoy Corp., Detroit, has a high tungsten content which hardens the matrix, to give it improved heat and vibration-resistant properties.

Originally developed to overcome fretting and fretting corrosion at temperatures of 1000°F and more on jet engine shafts, the material is also recommended for use in engine valves, chemical valves, acid pump parts, coal washers and cement screws, as well as in other jet engine applications. It also provides a superior wear-resistant surface for handling scouring type loose abrasives.

Materials:

Protective paint applied before construction.

A paint system employed by the U. S. Steel Corp. in coating corrugated galvanized steel sheets for use on buildings of their plants is reportedly proving outstanding for economy and durability. The system comprises a primer coat of Vinsynite AU-1, supplied by Specialty Coatings Inc., division of Thompson & Co., Oakmont, Pa., followed by a double coat of vinyl paint formulated specifically for this use.

Vinsynite is a wash-primer type of precoating which deposits, in one application, a phosphate coating and a thin organic film, designed to forestall corrosion and provide adhesion for topcoats of paint on freshly galvanized surfaces. The double vinyl topcoat is used to increase durability and it is non-flammable.

Spray application is accomplished before erection by means of a conveyorized production line. In addition to speeding up the painting, this method permits coating all parts of each sheet, including laps and edges.

ULBRICH Stainless Steels

Certified ANALYSIS can be given on any Ulbrich material.

COMPLETELY EQUIPPED CONVERTING WAREHOUSE

STRIP • Flat Wire and other Stainless Steels
Converted to your closest requirements and
exactly as you want it!
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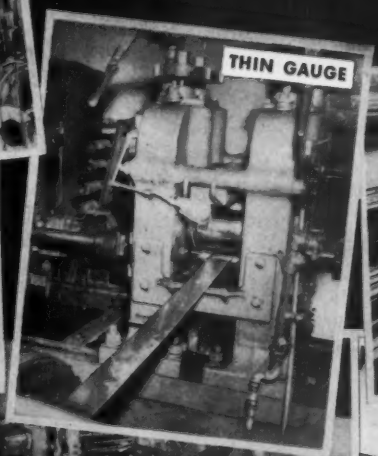

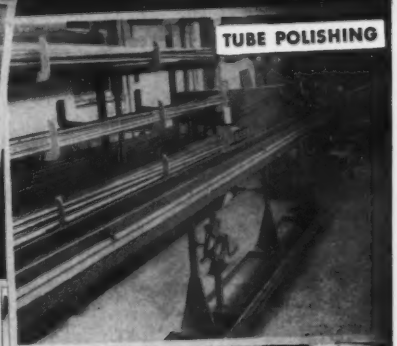

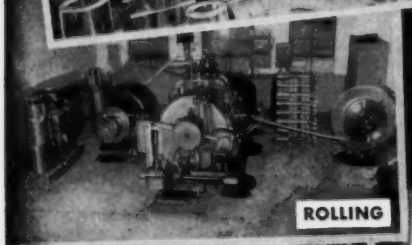

ULBRICH Stainless Steels

WALLINGFORD, CONN.

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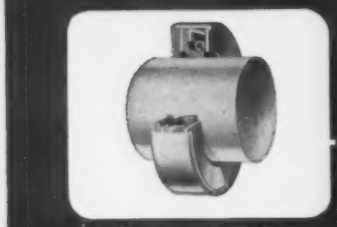
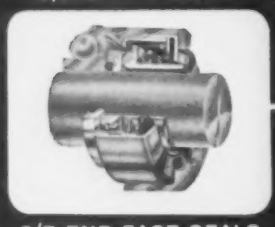
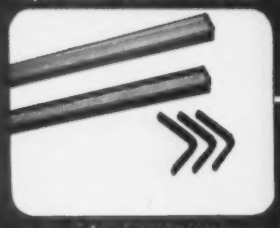


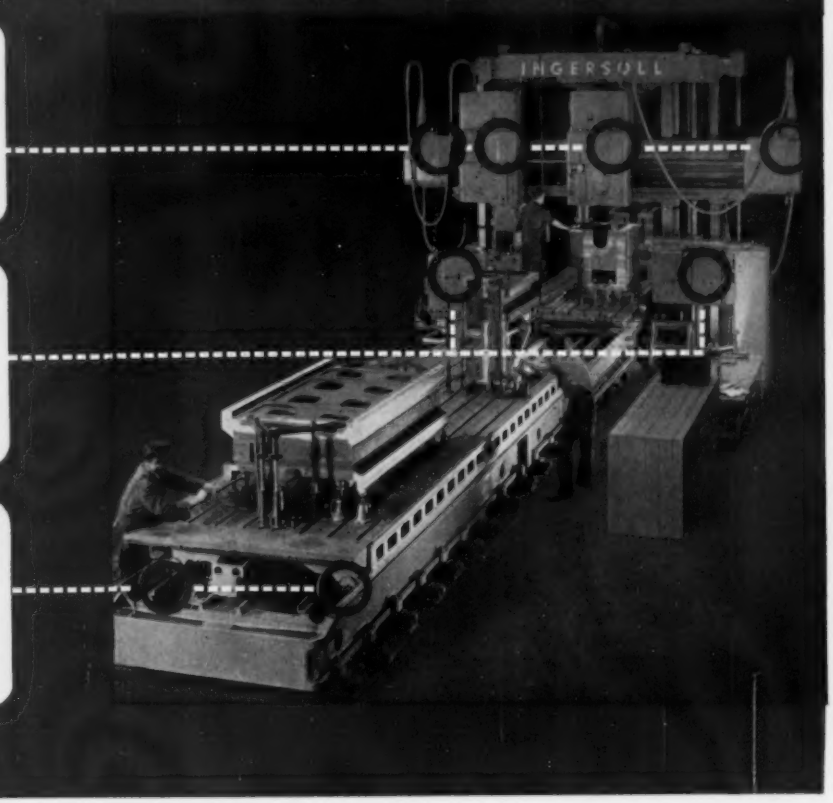
C/R SHAFT SEALS



C/R END FACE SEALS



C/R SIRVENE WAY WIPERS



Which seal is the best answer to your problem? C/R Engineers know. They've helped machine tool builders solve tough sealing problems—successfully—for years.

C/R SHAFT SEALS deliver outstanding sealing performance and service life on medium speed shafts, gear cases and drive mechanisms. They seal lubricants, exclude chips, coolants, abrasives—and require minimum radial and axial space.

C/R END FACE SEALS are lapped to micrometric tolerances to provide absolute lubricant retention and exclude chips, coolants and all foreign materials on high speed spindles, shafts and drives under the most critical service. Normally they operate throughout the entire life of the machine tool.

C/R SIRVENE WAY WIPERS give maximum protection to sliding assemblies under long and continuous operation, and will not lap or mark rails. Available in metal-cased, spring-loaded, and plain designs for flat, angular and circular ways.

More automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device.

OIL SEAL C/R DIVISION

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CHICAGO RAWHIDE MANUFACTURING COMPANY
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Offices in 55 principal cities. See your telephone book.
In Canada: Manufactured and Distributed by Super Oil Seal Mfg. Co., Ltd., Hamilton, Ont.
Export Sales: Geon International Corp., Great Neck, New York

Other C/R Products
Sirvene (synthetic rubber) molded pliable parts • Sirvis-Conpor mechanical leather cups, packings, boots • C/R Non-metallic Gears

HOW TO GET MORE FOR YOUR METALWORKING DOLLAR

Number 1 of a series

STAINLESS STEEL

How To Get More For Your Stainless Steel Dollar

To say that stainless Type 304 is a far cry from a plain carbon steel is to state the obvious. Everyone knows the two materials are miles apart metallurgically.

What is less obvious is that many of the controlling factors for purchasing stainless steels are equally distinct. So that applying your favorite set of "plain carbon" buying rules to stainless steels could be a costly mistake.

What makes the buying of stainless different? For one thing, being able to make the most of the fine points of stainless chemical compositions. For another, understanding the three, basic stainless metallurgical types.

Stainless fabrication also calls for a fresh approach. The same applies to many of its engineering problems. To get a better stainless product at a tidier profit still requires getting the best from your purchasing, production, and engineering teams.

When you read this special feature, you'll know how it all adds up to getting the most for your stainless steel dollar.

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Stainless Types

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Purchasing

BUYING FACTORS

◆ PURCHASERS intending to get the most for their stainless steel dollar could probably make good use of a pair of mental "bifocals." For the problem they are asked to examine is at least two-sided. Both sides, moreover, should be focused into one overall, composite view.

But, for purposes of simplification, let's take the sides of the purchasing problem one-by-one.

First, there is the matter of sales potential —the amazing sales potential of stainless products. This highly potent factor has to be neatly weighed off against stainless steels' relatively high cost.

Then, on quite a different tack, there is engineering potential. Along this side lay all of the special properties of stainless materials, the properties that make stainless so valuable.

From the purchaser's standpoint, the proper integration of these two aspects of stainless buying should provide the answer he's after. That answer is, of course, getting the most for his stainless dollar.

To begin with, let's analyze each aspect of the problem in logical progression. The first, and least complicated, is sales potential.

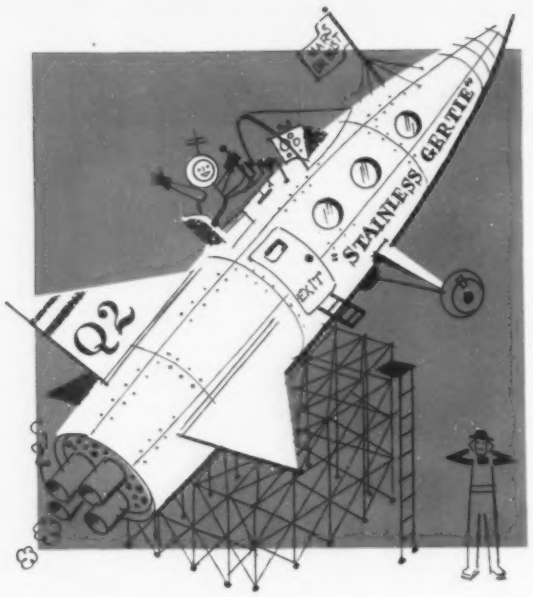
For millions of consumers, "stainless" is its own best salesman. Like the stamped "14K" on Grandpa's watch, it has come to be thought of as a kind of universal trade mark, a guarantee of certain known qualities. Strictly on a performance basis, it has evolved as a selling point of, by, and for itself.

Relatively few materials can make that claim. As claims go, it has the sort of built-in sales appeal that manufacturers of consumer items just can't afford to overlook. And, as you might expect, they haven't. They have very logically put it to work in pots, pans, cutlery, automobiles—tens of thousands of consumer items.

But what about engineering potential? Stainless steels are primarily engineering materials. Their importance is certainly not limited to boosting the sales of pots and pans.

Here's where complications set in, particularly for the purchasing agent who is not primarily a metallurgist. To begin with, the magic "stainless" trademark—in spite of its selling potential—is a kind of blight in metallurgical parlance.

The term "stainless" is just too simple—so simple, in fact, that it fosters a lot of confu-



"stainless steels are primarily engineering materials . . . certainly not limited to boosting sales of pots and pans . . ."

sion. No one denies that it is reasonably descriptive. But since it describes only one performance characteristic of stainless materials, it is hopelessly inadequate.

To the non-technical mind, "stainless" seems to connote a single, all-embracing material. That this concept is both incorrect and confusing probably means nothing to the housewife or the buyer of decorative accessories for the family car.

But from the standpoints of purchasing, fabrication, and engineering, this brand of confused thinking can be dangerous as well as wasteful. Certainly the *buyer* of stainless steels must first understand that he is buying materials with remarkable and highly specialized properties.

The variety of stainless grades made available are justified only because of the highly specialized nature of each major stainless type.

So don't miss the main point. Don't try to generalize stainless grades to a degree that blurs their individual significance. Remember that a lot of careful engineering has gone into making the available types separate and distinct.

Remember, too, that you are buying a product that is not only high in quality but is also pretty much custom made. Each grade has been intentionally designed to fit certain very definite requirements. Too many generalizations—especially of the wrong sort—tend to scramble the very logical bases for variations in stainless chemical compositions.

When you buy a custom steel with a rather high alloy content, you normally expect to pay a somewhat higher price. And you do, because stainless steels aren't cheap.

A quick glance at basic price lists tells you that even the cheapest stainless grade sells for slightly better than 31 cents per pound—free of any and all extras. And, as you might expect, the lowest base price applies to a relatively low alloy grade.

Of course, there is a very much brighter side to the cost picture. Many stainless grades can be bargains because of their special ability to do a particular job—and do it better.

The relatively steep cost of stainless grades is easy to understand. All stainless steels contain fairly high percentages of expensive alloying elements—principally chromium, nickel and manganese.

Not only aren't these elements cheap, but their supply is definitely limited. The bulk of the world's supply of these three critical elements is to be found outside the U. S. For this reason, a hefty percentage of these materials is stockpiled under governmental auspices. In an important sense, buyers are morally obliged to use these materials wisely and, in some instances, frugally.

That stainless steels differ metallurgically from plain carbon and low alloy grades is generally understood. What is less obvious is that many of the controlling factors for purchasing stainless grades are also different. For this reason, applying the same set of buying rules that work nicely for plain carbon grades can be a mistake.

Let's make the last statement even more emphatic. In many instances, your approach to buying stainless steels should be about the reverse of the one used for buying plain carbon grades.

Where stainless differs

Certainly, some of the pricing factors—especially those for alloy extras—are about the same in principle. But it is extremely important to recognize, and make the most of, some of the more important differences.

The wise buyer of plain carbon sheet or strip might well consider such features as drawing quality and surface finish of prime importance. This makes excellent sense in the case of a plain carbon grade where ease of fabrication holds top priority. But it doesn't make sense in the case of specialty steels — particularly stainless.

When buying stainless, all pertinent considerations must first be fitted to two controlling factors. These factors are 1) metallurgical type and 2) basic chemical composition. Understanding the significance of these factors is possibly the most essential step in getting the most for your stainless dollar.

So at the outset concentrate on the basics. Study the controlling principles with an entirely open mind. Understand what you are buying and why before getting tangled in a maze of special requirements and contradictory claims.

Since chemical composition determines most of the metallurgical aspects of stainless steels, first familiarize yourself with the three basic stainless types. An understanding of why there are three major stainless types and what makes them different from each other will make any subsequent review of compositional fine points a lot easier.

METALLURGY FOR P.A.'s

◆ All stainless steel grades can be classified as belonging to one of three basic groups: 1) austenitic, 2) ferritic, and 3) martensitic.

While these terms are admittedly academic, they are the ones commonly used by metallurgists. They are also used by the stainless steel producers. To this extent, at least, familiarity with the prevailing terminology is important to the steel buyer.

The austenitic grades derive their name from the fact that their metallurgical structure, when examined under the microscope, is made up predominantly of austenite. These stainless alloys contain relatively large percentages of *both* chromium and nickel. Almost all of the stainless "300" series belong to this family.

"the buyer of stainless must understand he is buying remarkable and highly specialized properties . . ."

Austenitic alloys can usually be counted among the more expensive stainless grades because of their high alloy content. Depending upon the specific grade chosen, they may contain from 16 to 26 pct chromium and from 6 to 22 pct nickel.

Obviously no one would be interested in footing the bill for all of this alloy without some highly tangible justification.

In a majority of industrial applications, the number one reason for using austenitic grades is because of their superior corrosion resistance. For when it comes to resisting a variety of corrodents, these stainless alloys are especially versatile.

Lists are available which indicate the various corrosive media along with the particular austenitic grades best suited to resist their chemical attack. The number of corrodents listed is quite extensive and is added to whenever new applications arise.

The corrodents include not only chemicals but also food products, wastes, and corrosive atmospheres used in thousands of commercial and industrial applications.

So that if your material problems involve corrosion, don't hesitate in obtaining a copy of such a list from your stainless steel supplier. It provides an excellent starting point for choosing the stainless grade best suited to your needs.

Corrosion resistance is not, of course, the only reason for choosing an austenitic stainless. Many of these alloys have unusual strength and toughness at both extremely high and low temperatures. Some can be satisfactorily applied at high loads at temperatures ranging from —300° to about 1650°F.

Other properties also recommend their use for special industrial applications.

But with the exception of the more common 18 pct Cr-8 pct Ni types, most of the austenitic grades are generally reserved for the industrial, rather than the commercial, application.

Avoiding work hardening

Cost is certainly a determining factor in this distribution, but machinability is also significant. The austenitic grades are not easy to machine. What's worse, they tend to work harden when machined "improperly." Proper vs improper methods for machining austenitic grades is a kind of never-ending argument that serves to fill braces of books on machinability.

The most logical reason for the rather restricted use of many austenitic grades is fairly obvious. They are, by and large, much too valuable to waste on a variety of applications that can be handled equally as well by either ferritic or martensitic grades.

The ferritic grades are also named after a predominating metallurgical structure. These

alloys are nickel-free and contain from 14 to 27 pct chromium. Typical of the ferritic grades are stainless types 430, 442, and 446.

Compared to many austenitic grades, ferritic stainless steels can be a bargain. Some of them are priced at about half the figure set for nickel-rich alloys. But don't take this to mean that they are only about half as good as austenitic grades. Far from it.

The ferritic alloys have a number of strong selling points quite aside from cost considerations. Most of their room temperature properties compare favorably with those of more expensive alloys. And their corrosion resistance is definitely on the high side.

Weighing alloy savers

All ferritic stainless grades are unaffected by normal atmospheric corrosion. This sets them up as a "natural" for thousands of forms of decorative trim and product embellishment.

Since most food products don't attack them, they are widely used in the food utensil and equipment field. Topping this, they resist chemical corrosion in such rugged industrial corrodents as aluminum hydroxide, ammonia, bleaching solutions, nitric acid, silver nitrate, and tannic acid. Add to this the fact that their load carrying capacity at elevated temperatures is good up to about 1300°F.

Of course, all products have to be fabricated somehow. And the question of ease of fabrication is bound to pop up sooner or later. Ferritic stainless alloys have an important edge in this respect. They aren't tough to machine. Certain grades are actually free-machining, thanks to a couple of extra pinches of sulphur or selenium.

Drawing isn't too much of a problem either. The ferritic stainless alloys with about 17 pct chromium are actually recommended for deep drawing and the more complicated forming operations.

The martensitic stainless alloys are distinct from other grades because they can be hardened and tempered pretty much the same as hardenable, low alloy steels. One characteristic the martensitic alloys have in common with ferritic grades is that they contain little or no nickel.

Martensitic alloys can be classified under two general headings, the first general class containing from 11.5 to 14 pct chromium and a relatively low carbon content (frequently not over 0.15 pct). A second class is higher in both chromium (16 to 18 pct) and carbon content (0.60 pct and over).

As a rule, both classes can be considered as ranking among the more modestly priced stainless grades. Strictly on an initial cost basis, they are highly comparable to the ferritic stainless alloys. The fact that they contain little or no nickel not only colors pricing considerations, but also strengthens their position from the standpoint of alloy conservation.

Practically, the "ace in the hole" for the martensitic alloys ties in with their ability to respond to conventional heat treatments. This provides them with a number of structural advantages at room temperatures and upwards to about 1200°F.

They also combine reasonably good corrosion resistance with strength that is superior to that of plain carbon and most low alloy steels at elevated temperatures. Their improved strength in this respect links directly with their superior resistance to "tempering."

Although their corrosion resistance is far better than that of low alloy steels, it is considerably inferior to that of the austenitic grades and not quite on a par with that of the ferritic alloys. Still, the important point to remember is that there are many conditions of mild corrosion where these differences are not of serious consequence.

As stainless alloys go, the martensitic grades are not considered "tough" to machine. Like the ferritic grades, they will usually machine best in a hardness range of Rockwell C 19 to 26. There are exceptions to this rule, however.

"study the controlling principles of stainless with an entirely open mind . . ."

FINISHING EXTRAS

◆ The selection of a particular alloy grade best suited to product requirements is primarily the responsibility of engineering and production. The wise purchasing agent recognizes this prior responsibility *and proceeds from there.*

"no one would be interested in footing the bill for all of this alloy without some highly tangible justification . . ."

The "from there" covers a lot of territory and points up purchasing's real contribution to the total picture. Mostly, the purchasing man keeps a weather eye on steel "extras." In the final choice of an alloy grade, he tends to concentrate on alloy extras—bearing in mind that it is only one aspect of the overall problem.

For, as is the case with plain carbon and low alloy grades, the careful consideration of all "extras" is still a major purchasing function.

"Extras" are the premium you pay for certain special qualities in the steels you buy. The buyer who ends up with the most for his stainless dollar will carefully balance the "extras" available against the quality required in the fabrication and operation of his product.

As an introduction to the general problem of steel extras, let's first consider the matter of finishing extras for stainless sheet. Stainless sheet (after you've picked your grade) can be bought to any one of seven different surface finish requirements. Naturally, the fancier the finish requirement, the higher the cost.

A No. 1 finish designation for stainless sheet materials calls for a hot rolled, annealed and pickled surface. This is anything but a fancy finish but, where it can be used, it can result in significant *initial material* savings.

Take the case of a stainless sheet metal part that requires, as part of its fabrication, a series of forming operations interspersed with some in-process anneals. The hot rolled No. 1 finish can frequently suit the bill because a fancier finish would be wasted in processing.

A No. 2D finish is dull, cold rolled before final annealing and pickling. Many shops prefer this finish for jobs requiring severe drawing operations. One reason is that the dull finish seems to help out in die-to-material lubrication. Where a brighter final finish is required, such parts are normally buffed and polished in later finishing operations.

If drawing requirements are less severe, a No. 2B finish could be the better buy. This is a bright finish which has been given a light cold roll. The principal advantage of the 2B finish is that it requires considerably less buffing and polishing in the final stages in order to produce a highly polished surface. So that where drawing needs will permit its use, the 2B finish can provide tidy savings in buffing and polishing.

Even though it costs a little more, the stainless No. 4 finish is the most widely used. Somehow it seems to suit the garden variety of general stainless finishing requirements.

It is a polish that provides a bright uniform surface without high reflectivity. It is a bright —but not a mirror—finish. Not only is the surface pleasing from the standpoint of appearance, but it can also be readily protected in brake forming, shallow drawing, or stamping.

Under conditions of proper handling, the popular No. 4 normally requires no further polishing. Where a shinier finish is needed, final polishing would be considerably lessened. So that, considering the amount of final polishing that can be eliminated in this manner, the No. 4 finish has a very strong selling point. This is especially true for shops whose polishing facilities are scanty or non-existent.

Specifying a No. 4 finish should be carefully examined in the light of other possible cost reductions resulting from an initially more attractive surface. The finish itself can be an exorbitantly expensive item where it is not thoroughly justified.

Which fancy finish

Depending upon sheet thickness, a No. 4 finish on one side of a sheet will involve an extra of from 7.5 to 17.75 cents per pound. The price tends to climb as the sheet thickness goes down. Highest price listed (17.75 cents) applies to 26 gauge sheet which has a nominal thickness of 0.0177-0.0198 in.

More highly polished surface finishes are also available. A No. 6 finish is applied by carefully polishing and brushing with tampico fiber. The end result is a highly attractive, soft, satin finish.

Nos. 7 and 8 go even further. The No. 7 finish is the highest finish commonly used. By definition, it is a semi-mirror finish. No. 8 is a full mirror finish and can be had on special order only.

When you call for these extra fancy finishes, remember that paying higher premiums for the polishing involved doesn't entirely settle the cost picture. You will also want to do a more careful job of protecting the costlier surface finish in shipment. This may involve extra handling, special lubricants, paper, tape, and padding. Such items are not "on the cuff."

Nos. 6 and 7 finishing extras for one side of a sheet only, range from 11.5 to 35.0 cents per pound. Under the circumstances, you would want to restrict polishing to one side of the sheet whenever and wherever possible. Polishing on both sides can cost you more than the base price of the most expensive stainless alloy analysis available.

None of this information is intended to discourage those who really require the costlier surface finishes. There are always instances where even a No. 8 finish can be readily justified either from the standpoints of appearance, engineering, or fabrication.

But for the cost-conscious buyer who intends to get the most for his stainless dollar, such major cost items deserve the maximum of careful attention. So don't make the mistake of paying for a surface finish you don't need. And, wherever feasible, restrict your fancier finishing requirements to one side of the sheet only.

Finishing extras are most significantly applicable to sheet, solid and clad plate, and some types of stainless wire. They are considerably less important when it comes to strip, bar, tubing, special shapes and billet.

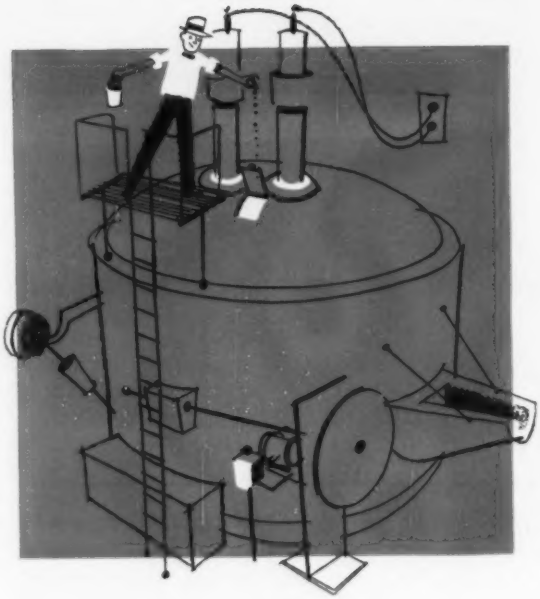
OTHER EXTRAS

◆ By and large, most stainless extras can be readily equated with the extras that apply to all steels. They aren't likely to surprise the buyer of plain carbon or low alloy steels by virtue of their novelty. But they are sufficiently numerous to pique his taste for uncovering a variety of cost-reduction items.

In addition to alloy and finishing premiums, stainless sheet, strip and plate may carry extras for shearing, quantity, length, gage and width, packing, and special tests. Bars and special shapes may bear extra charges for size, quantity, irregular shapes, special tests, and boxing and burlapping. Each of these premium charges deserves your careful review.

Dropping any one of these extras can result in an appreciable saving, especially when large quantities are involved. Remember, too, that buying in larger quantities can often eliminate a quantity extra. So don't order on a piece meal basis except in cases of dire necessity.

Living with the standard chemical analysis is smart economically regardless of the type



"some stainless is free machining, thanks to a couple of extra pinches of sulphur or selenium . . ."

of steel you buy. This is particularly true when you're buying a stainless. The selection of available chemistries is not only adequate, it is sufficiently profuse to sometimes lead to customer confusion.

If your requirements parallel those of tens of thousands of stainless users, chances are you will probably find it impossible to justify a chemical extra. Only rarely is this added expense justifiable. When such a case does arise, it is usually a far cry from the average commercial or industrial requirement.

The aircraft industry, of course, can usually be depended upon to provide the exception to almost any rule. Some years ago, an aircraft engine manufacturer was having trouble obtaining the minimum hardness requirement for stainless steel compressor blades. The blades were made of a 12 pct chromium, martensitic-type steel. After hardening and tempering, the blades were frequently a Rockwell point or two below the blue print requirement. The shortcoming was frowned upon by the Air Force and ultimately could have affected all engine shipments.

In time, the problem became crucial. Every conceivable metallurgical angle was carefully checked in an attempt to track down the discrepancy. Finally, the cats-whisker deficiency was traced to a small amount of retained austenite. The austenite, in turn, was attributed to the residual nickel content present in the chromium alloy. This amount was considerably less than ½ pct. But to eliminate it entirely, most certainly called for a chemical "extra."

Considering that all engine production was at stake, the added chemical requirement was not exactly frivolous.

This case is significant as an example of the rare instance where paying for a chemical extra (in the form of a rigidly prescribed chemistry) appears to make sense. Not only are such cases uncommon, but on a purely statistical basis it is evident that U. S. industry limits most of its stainless buying to a very few standard grades.

NARROWING YOUR SELECTION

◆ Of the more than 40 types of stainless steels commercially available, six types account for over 50 pct of the total U. S. tonnage. Type 430 heads the list. Alone, it accounts for about 20 pct of the total stainless produced.

Type 302 holds second place with a little more than 10 pct of the total tonnage to its credit. The next four leading grades—ranked in order on a tonnage basis—are Types 304, 301, 316, and 410.

With these statistics in mind, it is evident that the majority of stainless applications—industrial and commercial—are being covered by only six alloys. Of the six, four are basically of the 18 pct Ni-8 pct Cr variety, with or without minor variations. Of the two remaining grades, one is a 16 pct Cr ferritic type and the other a martensitic, 12 pct Cr alloy.

Viewed from this perspective, choice of an alloy type appears considerably less complex. If yours is an "average" application, chances are better than even that you can safely limit your choice to one of six alloys.

Let's take a closer look at each of these alloys to discover what it is that accounts for their popularity. The most popular alloy, Type 430, is a nickel-free, low carbon, high chromium, ferritic steel. Relatively low in cost, it is strong on resistance to corrosion and to oxidation at elevated temperatures. It leads Type 410 in corrosion resistance, thanks to a higher chromium content.

From a shop standpoint, it is also a leader. It doesn't work harden, and it isn't tough to machine. It can be readily worked, hot or cold. It welds easily and can be drawn, stamped, formed or forged.

The next four grades represent branches of the same general family. All are austenitic types. In this classification, they represent both the lower and medium priced grades.

Types 302 and 304 are of the standard 18-8 variety. The latter grade has less carbon (0.08 pct max.) and is therefore less susceptible to harmful carbide precipitation during welding. It is the better bet of the two for corrosion resistance when subsequent heat treatment isn't feasible or boosts cost factors significantly.

Type 301 is a hybrid or low alloy type 18-8. It saves some alloy but not without some sacrifice in corrosion resistance. Type 316 represents a step in the opposite direction. It might be considered a high alloy 18-8 with extra chromium to boost its corrosion resistance. It also contains molybdenum, an addition intended to serve the same purpose.

All of these alloys are austenitic types. While they have some characteristics in common, they also exhibit certain basic differences. Remember that corrosion resistance, weldability, and formability can be significantly altered by even minor changes in alloy content. So study each grade separately. Weigh all of the pros and cons in terms of your particular application.

Because of the continuing shortages of nickel, pay close attention to the 12 pct chromium alloys—such as Type 410. And don't overlook the low nickel, manganese grades, Types 201 and 202. These alloys are quite new, but recent research claims they are capable of replacing Types 301 and 302 in many commercial applications.

If the boom is again let down on the use of nickel, knowing more about these conservation alloys is bound to be advantageous. Of course, there's another good reason for wanting to know more about them. They're considerably cheaper than the 300 series. When it comes to cutting cost corners, they offer still another possibility for getting the most for your stainless dollar.

"you will want to do a more careful job of protecting the costlier surface finish in shipment . . ."

Turning

Milling

Welding

Brazing

Annealing

Stress Relieving

Hardening

Grinding

Polishing

Drilling

Processing

PUTTING STAINLESS TO WORK

◆ WHEN a shipment of stainless steel arrives at your plant, its appearance has involved a lot of careful planning. Planned buying is your purchasing department's primary function. And they've been "on the ball."

They started out by getting expert advice from engineering and production about the types of stainless to buy—the types best suited to your products. Then they proceeded to check a maze of quality considerations.

Not forgetting costs for a moment, they chased the problem of stainless "extras" with the perseverance of a hound dog. They followed countless details right down to, and including, the fine points of packing and shipping.

When they finally placed an order, they could be confident that they had lived up to the purchaser's responsibility. They had done all *they* could to get the most for their stainless dollar.

But with the steel unloaded at the receiving platform, major responsibility takes a sharp turn. It switches directly to those charged with putting stainless to work.

This is a combined production and engineering function. The quality of the final product along with much of its profit-making potential are in their hands. They make the dollars invested in stainless steel count.

This is true because no product—whether stainless or what have you—can be any better than the engineering and manufacturing processes that produced it.

It is for this reason that engineering and manufacturing processes can never be routine, except in the strictly procedural sense. Certainly, "A" is followed by "B" which, in turn, is followed by "C." But there is always an important qualifier.

"A," "B," and "C" are never really constant. There is always a challenge. Today's run-of-mill procedure could become tomorrow's sparkling declaration of engineering and processing ingenuity.

Take the "routine" matter of machining. When it comes to machining stainless, some job shops dodge the responsibility like the plague. And why? Because machining stainless isn't a dead cinch.

This medieval approach to fabrication seems to take for granted that product improvement doesn't pay. Because—after all—it involves change, extra effort, some thought.

Certainly, machining stainless is a challenge

for those who haven't tackled the job before. The medievalists are right when they argue that it takes skill, "know how." It *isn't* a dead cinch.

But when *was* "being a dead cinch" *ever* a criterion for engineering and manufacturing progress?

MACHINING

◆ TO successfully machine stainless, you've got to know your business. You've got to know that there are such things as proper tools and proper lubricants. That the cuts you take are going to be a bit heavier and are going to require a somewhat higher powered motor. That your equipment must be reasonably rigid to avoid chattering and "walk." And—most important—that thinking and machining have more than just a little in common.

High speed steel tools are considered a wise investment for the continuous turning of most stainless grades. For an even better surface finish, it may be necessary to resort to a tungsten carbide. Once you've sized up your requirements, don't skimp on good tooling. Instead of saving money, you'll be wasting it.

The most important pointer for turning the austenitic grades is to make sure your tool doesn't "ride" the work. "Riding" results in work hardening the surface with possibly disastrous consequences to both tool and surface finish. A chip curler will help keep the tough, stringy chips away from the work and ease machining.

Turning both ferritic and martensitic grades should be easier if recommended practice is followed. For most ferritic grades, grinding a chip bearer on the tool seems to help. Proper heat treatment will often ease the machining of martensitic grades.

Since the martensitic grades do respond to conventional heat treatment, the idea is to obtain optimum structural homogeneity. In metallurgical parlance, this means holding the amount of "free ferrite" to an absolute minimum. Since ferrite is soft and gummy, it tends to create intermittent tool slippage and chatter. Here, a dollar invested in proper heat treatment could save three or four in tool sharpening and breakage.

Drilling stainless also calls for rigid equipment. High speed drills are usually a "must." Equally important is keeping your drill length as short as the job permits. The shorter the drill, the better are your chances for eliminating whipping and backlash.

Boosting drill life

Recommended grinding practice for drill tips calls for 130-140 degree included angles. Make sure the rake is equal on both sides with the apex of the tip in line with the center of rotation. Also make sure you provide plenty of clearance. The abrasive action of stainless chips can drastically shorten tool life. Proper clearance and adequate lubrication are your only positive cures. If cutting tool costs is your objective, put the cures to work with each new drill you use.

Tapping stainless grades can be adequately handled with standard taps. High speed steel is the commonly accepted tap material for the job, and experience seems to indicate that ground threads provide best results from the standpoint of dimensions.

While through-hole tapping presents very few special problems, tapping blind holes can be complicated by chip removal. Tackle this problem by allowing sufficient chip room, a long chamfer, and plenty of lubrication in the form of pastes and sulpho-chlorinated petroleum oils.

Cutter types similar to those used on mild steel, but made of a high speed grade, are acceptable for milling operations on stainless. But don't forget to set your cutting speeds somewhat below those used on plain carbon steels. Whenever possible, use helical, rather than straight, teeth.

Remember, too, that both axial and radial rakes should be kept on the high side to permit smoothest possible cutting. Increase your relief angles close to the maximum of 10 degrees on your larger cutters.

Shearing and cut-off operations on stainless steels are different but not necessarily difficult. As a rule, you will need anywhere from 30 to 50 pct more power than is recommended for a similar operation on the same thickness of mild steels. A sure way to avoid needless scrap is to keep your blades extra sharp. Make sure they cut, not tear.

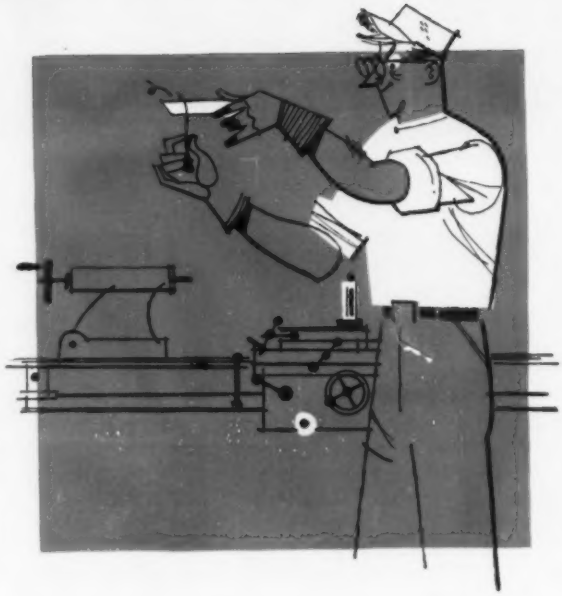
"the medieval approach to fabrication seems to take for granted that product improvement doesn't pay . . ."

The austenitic grades must be cut through completely in all shearing applications. This isn't usually the case with the ferritic and martensitic grades. You'll find that both will tend normally to break when they are sheared only halfway through.

Abrasive cutting operations, such as those handled by cut-off wheels, can be accomplished with or without a wetting lubricant. Wetting will help you avoid possible burning or metal discoloration due to overheating. Many resin-bonded wheels can be depended upon to produce the same results in a dry operation. This is because the resin-bonded wheel tends to rapidly absorb the heat of friction as it is generated. Choose the setup that fits in easiest with your other operations.

Experience indicates that flame cutting techniques used for mild and low alloy steels are not satisfactory for cutting stainless grades. On stainless, their action is relatively slow and produces melted and poorly defined edges.

Two recently developed flame cutting methods are known to produce satisfactory results. One, developed by Linde Air Products, feeds powderized iron to the hot, oxy-acetylene flame zone. The iron powder burns, releasing tremendous heat. A second method, contributed by Air Reduction, uses a flux in conjunction with the cutting flame. Both techniques make the flame cutting of stainless a fast and reasonably accurate operation.



"a sure way to avoid needless scrap is to keep your blades extra sharp . . ."

WELDING AND JOINING

◆ TO complete the fabrication and assembly of many stainless steel products, some welding is often essential. Depending upon the grade you're called upon to weld, the operation can be simple or quite complicated. Choice of a welding procedure most applicable to the particular stainless grade is half the battle. Here, again, it is important that you bear in mind some of the fundamental differences between the austenitic, ferritic, and martensitic grades.

Among the salient points you will want to remember is the fact that austenitic grades generally have a very high thermal expansion coefficient. This figure sometimes is as much as 60 pct higher than the coefficient of low carbon steels. Ferritic and martensitic alloys are at the other end of the scale with a lower thermal expansion than that of mild steel. Thermal expansion is especially significant in austenitic alloys because of the possibility of thermal cracking.

Above all else, make sure that your approach to welding stainless is well-rounded rather than one-sided. The best job is not only the product of good welding technique. It also involves a full appreciation of all of the metallurgical factors likely to affect the welded product.

This is particularly true because all stainless grades can be affected metallurgically at the high temperatures required for welding. If you have the metallurgical talent available, by all means put it to work on your welding applications.

Many of the available austenitic grades are not stabilized by columbium or a similar stabilizing element. Others contain more than 0.03 pct carbon. These alloys tend to precipitate complex carbides of chromium at grain boundaries partially as a result of welding. Unless you properly solution treat such alloys after welding, these precipitated carbides may constitute a weak point in terms of corrosion resistance.

The straight chromium ferritic steels tend to embrittle as a result of welding and usually require annealing to restore original ductility. Martensitic grades will, of course, harden as a result of being cooled from the welding temperature.

These hardenable alloys can be softened by tempering or annealing. They should be preheated to about 400°F before welding to reduce the chance of cracking. As a general rule, the martensitic stainless alloys should not be welded to other types of metals.

As a prelude to all welding, make sure that the surfaces to be welded are thoroughly cleaned of dirt, oil, grit, and oxide scales. Such contaminants frequently contribute to weld porosity and other weld defects. If cleaning is done by means of wire brushing, be sure your brush is made of stainless wires. This will help guarantee a surface free of rust contamination.

Because of variations in section size and the effects of thermal expansion and contraction, distortion can be a major welding headache. The austenitic grades are the most troublesome in this

respect and frequently require holding jigs or fixtures. If the fixturing is sufficiently rigid, allowing the work to cool in the fixture should help minimize distortion. The use of chill plates made of copper are also useful in this respect.

Stainless alloys can also be soldered or brazed. Depending upon design, the soldered joints can not be depended upon to be any stronger than the solder itself. Soldering, therefore, is safest where mechanical stress is negligible.

For all soft soldering applications, surface cleanliness is extremely important if a good bond is to be achieved. Many of the standard fluxes used successfully on mild steels are of no value on stainless. So make sure you use a special flux intended for soldering stainless.

Silver and copper brazing

Silver brazing of stainless alloys can be a tricky operation largely because of the possibility of cracking the base metal, altering its temper, or promoting deleterious carbide precipitation. Best brazing results are usually obtained with the stabilized austenitic grades. Again, a special brazing flux is required. Make sure you remove all of the flux residue after brazing is completed.

Copper brazing offers still another joining means. Unfortunately, the entire brazing operation has to be handled under protective atmosphere in order to prevent oxidation of the copper. Because of the high melting point of pure copper, furnaces temperatures required are in the neighborhood of 2100°F. The combination of furnace and atmospheric requirements tends to limit the process' popularity. When it is used, it is normally restricted to small parts.

HEAT TREATING

◆ THE importance of properly heat treating stainless alloys is frequently either misunderstood or dangerously underestimated. Why this should be so, is not easy to explain. But it seems to stem from the confusion that surrounds the subject of why stainless steels are heat treated *at all.*

Let's try to track down this line of reasoning to its essentials. First, the majority of stainless grades aren't hardenable in the conventional sense. Second, annealing doesn't seem to soften certain grades in the slightest. So why not assume that the heat treatment of stainless steels is relatively unimportant or—at best—a fancy metallurgical refinement? Or, as one slightly confused shop foreman expressed it: "*Maybe* I could *use* heat treating, but I don't really *need* it."

He might have added, "Or do I?"

The necessity for heat treating stainless steels cannot readily be reduced to a series of dogmatic "yes's" and "no's." Requirements vary in terms of both metallurgical and "in service" considerations. So that the surest preliminary answer to whether or not to heat treat is frequently, "it depends."

The heat treating of stainless alloys is intended to serve one or more of three functions.

First, solution treating is designed to redissolve precipitated carbides produced by holding at heat in the "sensitizing" range. This range can vary a great deal, depending upon the particular alloy. Its total spread for all stainless alloys is approximately 800-1600°F.

Breaking up these carbides by putting them into "solution" is the simplest way of restoring maximum corrosion resistance to unstabilized austenitic grades. It is also the surest way of getting the kind of corrosion resistance you've paid for.

But don't overlook the fact that solution treating can be equally useful when applied to ferritic and martensitic alloys. It provides structural homogeniety which can set you up with a starting point for any subsequent heat treating. In an important sense, it can be compared to the normalizing of low alloy steels.

As a result of hot forming operations such as forging, piercing, and upsetting, both ferritic and martensitic grades are frequently beaten into a structural hodge-podge. In this condition, both hardness and mechanical properties are apt to be seriously non-uniform.

Lack of structural uniformity can raise havoc in your machining operations. It can account for improper response to heat treatment. Most important, it can deleteriously affect corrosion resistance and other important requirements for "in service" performance.

"lack of structural uniformity can raise havoc in your machining operations . . ."

"forced air cooling is sometimes resorted to in an effort to reduce distortion . . ."

The solution treating range for most austenitic alloys is 1950-2100°F, depending upon chemical composition. This is commonly referred to as the annealing range since, in addition to dissolving carbides, it tends also to remove all stresses due to cold working and provide a minimum hardness.

To follow a dependable standard, set your time at solution temperature at 30 minutes per inch of thickness. Although time at temperature is not especially critical, always avoid prolonged soaking at elevated temperatures.

Temperature control during solution treating *is* critical. Too low a temperature will result in only partial solution treating. Too high a temperature can be even more serious. There is evidence that exceeding the prescribed solution treating temperature by as little as 50°F can impair corrosion resistance, especially in the sensitizing range (1200-1600°F).

Don't sell the evidence short. Invest in good furnace equipment and adequate temperature controls. Slipshod equipment and a mounting scrap rate go hand-in-hand.

If reprecipitation of carbides is to be avoided, austenitic alloys must be rapidly cooled from the solution treating temperature. If it is at all feasible, water quench directly from the furnace or heating source. Not only is it simple, it's also most effective.

A few words of caution are in order on the general subject of water quenching. Serious accidents are a possibility on this type of operation. First, be extra careful. Make sure that both your quenching container and water supply are more than adequate for the part being quenched. Quench your parts in a manner that will minimize or eliminate the possibility of steam entrapment. Bear this in mind at all times and make certain your operators follow suit.

Forced air cooling is sometimes resorted to in an effort to reduce distortion. You may even want to try die quenching if distortion warrants its use. Since water might seriously damage both press and die, play it safe by using a water soluble oil as the quenching medium.

Solution treating or annealing is the only type of heat treatment applicable to the ferritic stainless steels. It tends to lower hardness, relieve internal stresses and, when followed by rapid quenching, improve impact properties.

Depending upon alloy analysis, the annealing temperature range for these steels is 1450-1550°F. Partial annealing can be achieved by heating to 1300-1450°F and cooling in air.

Remember that the ferritic alloys can be subject to grain growth as a result of over-heating. In this condition, the materials are brittle and many of their mechanical and chemical properties are seriously impaired. Additional heat treatment will not reverse the trend and miraculously restore the original grain size.

Once you have seriously coarsened the ferritic grades, only extensive cold working will provide the necessary structural refinement. Since it is seldom feasible to provide adequate facilities for cold working in most shops, coarsened steels may have to be scrapped. So if you want to keep your scrap rate down—and get the most for your stainless dollar—don't overheat.

The martensitic stainless alloys can also be annealed. But since they are hardenable, the annealing process is somewhat more complicated. Rapid cooling would result in hardening, so that very slow furnace cooling is required to produce a fully annealed structure.

A representative range of annealing temperatures for martensitic grades is 1550-1650°F. These temperatures are well below the recommended solution and hardening range. Still, they are sufficiently high to produce a hardening effect upon rapid cooling.

Tips on hardening

Thorough annealing requires that the steels be furnace cooled at a rate of 25-50°F per hour until they reach 1100° or below. The annealing cycle is then completed and rapid cooling will have no adverse effect.

The procedure for hardening the martensitic grades is also slightly more complex. After heating uniformly to about 1000°F, the temperature should be raised gradually to 1450°F. The final temperature jump should achieve the recommended range of quenching temperatures. These may vary from 1750-1950°F, principally because of differences in chromium and carbon content.

Make sure that soaking time at temperature is not less than 30 minutes. This will insure complete transformation. Longer soaking times may be required for heavier sections.

After soaking, the steels may be quenched in either air or oil. Oil quenching will usually result in a slightly higher hardness and may slightly affect the tempering characteristics of some grades. Steer clear of water quenching because of the strong possibility of quench cracks.

It is considered safe to temper the martensitic steels in the ranges of 200-750°F or 1050-1200°F. The range of 800-1000°F should be avoided whenever possible. This is the so-called embrittlement range in which preferential carbides are precipitated. The resulting precipitation lowers impact strength and greatly reduces corrosion resistance. It also has a very harmful effect on stress-corrosion properties.

So much for the rudimentary ground rules of stainless heat treating. Your success or failure in any heat treating operation is heavily dependent upon the type and condition of the equipment you use. This is particularly true of heat treating stainless because of the very high annealing and solution treating temperatures required.

Anyone with a knowledge of furnace equipment will concede that it may not be especially difficult to control a small furnace up around 2000-2100°F. But maintaining temperature uniformity in a larger furnace in this temperature range is apt to be problematical. If your requirements are at all fussy, you may find that only a furnace specifically designed for ultra-high temperature operation will suit your needs.

Even if you obtain such a furnace, you should recognize that any piece of equipment is likely to take a considerable beating at these elevated temperatures. Brick work, elements, doors, and other accessories are bound to require frequent checks. Considering the initial cost of equipment, it doesn't make sense to stint on furnace inspection and maintenance.

Locate your pyrometric controls in such a way as to insure reasonable temperature uniformity at all times. Also provide some checks capable of detecting a breakdown as soon as it occurs.

Even after adequate controls are installed, probe checking for furnace hot and cold spots should be conducted on a periodic basis. Certainly, whenever a furnace is shut down for major repair, never make the mistake of putting it back into operation without first running a thorough uniformity check.

"steer clear of water quenching hardenable stainless because of the strong possibility of quench cracks . . ."

Protective atmospheres

Depending upon your product requirements, you may not need a protective atmosphere for annealing the austenitic grades. A tight muffle furnace free of excess moisture is known to produce rather satisfactory results. If you can skip the atmosphere, you simplify your operations and save money at the same time.

But there are instances where a specification will insist upon a protective atmosphere. If such is the case, hydrogen, nitrogen, or cracked ammonia—in a very dry condition—are safe to use. Make sure your parts are perfectly clean and free of all contaminants that might react chemically with these gases.

Never—under any circumstances—use a protective atmosphere that has a carburizing potential, however slight. Such gases as carbon monoxide, methane, butane, and all forms of propane come under this heading and should be definitely avoided.

In heat treating the martensitic alloys, it is important that you guard against both oxidation and decarburization. While it is true that exothermic gas mixtures have been tried as protective atmospheres for these grades, they can not be depended upon at all times. Now and then they have a tendency to carburize.

Even when alloy carbon content is as high as 0.30 pct, carbon-free atmospheres are still your safest bet. Remember, too, that an atmosphere that is slightly oxidizing is generally recommended over one that is wholly reducing.

Because it is often difficult and sometimes impossible to provide a dependable protective atmosphere in shops with limited facilities, salt bath heat treating is being widely used as an acceptable substitute. If you decide in favor of a salt bath, be very careful in your selection of salt. Make sure you choose a type that is chemically neutral and will not in any way react with the parts being treated.

Once you've decided on the neutral salts best suited to your application, bear in mind that these salts will be subject to contamination as a result of use. Don't take their continued neutrality for granted. Play it safe by checking salts periodically.

◆ AN attractive surface finish can be an important selling point for many stainless steel applications. It pays to make the most of finish wherever it contributes to the salability of your product. But don't make the costly blunder of polishing where finish requirements are of no particular significance.

A fancy finish would normally be wasted on industrial applications involving operation at elevated temperatures or in highly oxidizing or otherwise corrosive atmospheres. Some industrial users do require a high finish even though its primary function is not decorative. Food product manufacturers provide a typical example.

The majority of finishing operations begin with grinding. It offers a fast and simple means for removing major surface defects, smoothing weld beads, and preparing surfaces with the uniform finish desirable for any subsequent polishing operations.

Rough grinding's primary job is the smoothing of major surface defects or blemishes. It is an important starting point. When properly handled, it can make the polishing operations that follow easier and cheaper.

For this reason, a uniform job of rough grinding should be viewed as a sound investment. Your object is to remove surface blemishes, not add to them. Non-uniformity in rough finishing inevitably shows up in finer polishing.

So don't waste time and money having to retrace your polishing steps. Start with a uniformly ground finish.

For the best grinding results, it is essential that your wheel cut freely. Wheel "loading" not only tends to mar surface finish but can also contribute to serious burning and distortion. Most shops prefer a hard wheel for initial grinding. Both rubber- and bakelite-bonded wheels are widely used for this purpose.

But for extremely rough work, it might be necessary to make a first pass with an aluminum oxide wheel. Such wheels are generally recommended for heavy weld bead removal.

If it's top efficiency you're after, always run your wheels at the speeds spelled out by the wheel manufacturer. Arbitrary choice of speed can result in wheel damage, breakage, or a substandard finish. Wheel pressure is equally important. Putting too much pressure on a work hardening stainless tends to slow, rather than speed up, your cutting potential.

Once you've achieved a uniformly ground finish, the next steps in surface finishing are polishing and buffing. Polishing is simply the logical extension of grinding. It produces a smoother surface by making use of progressively finer grits. Buffing is the final operation required for obtaining a high gloss. It calls for a combination of relatively soft wheels primed with special buffing compounds.

"polishing procedures seldom lend themselves to precise scientific method . . ."

Choosing the right initial grit is the starting point of an efficient polishing setup. You may have to resort to trial and error methods in order to decide upon the best starting grit for a particular job. If so, don't feel discouraged. Polishing procedures seldom lend themselves to precise scientific method.

But, however confusing the choice of an initial grit may be, its function is straightforward. It must be able to remove all evidence of grinding and prepare the surface for even finer polishing and buffing. Depending upon the finish you obtain in grinding, your initial grit may be either a No. 80 or a No. 100.

ACKNOWLEDGMENT

The editors want to thank the purchasing and production people whose ideas and practical suggestions helped make this feature possible. Also, they want to acknowledge the generous assistance of Allegheny Ludlum Steel Corp., Committee of Stainless Steel Producers, American Iron and Steel Institute, Carpenter Steel Company, and Crucible Steel Company of America.

WANT EXTRA COPIES?

A limited number of copies of "How To Get More For Your Stainless Steel Dollar" will be available upon request to Readers' Service Dept., The Iron Age, Chestnut and 56th Streets, Philadelphia 39, Pa.

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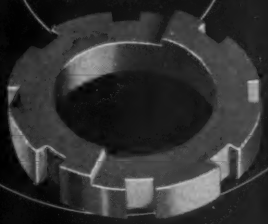

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METALS: Stainless Aids Tools

Increased tool life, fewer rejects result when stainless steel tubes are chosen for ultrasonic machine tool . . . Less warpage in brazing cited.

Stainless steel tubes are reportedly preventing warpage from brazing and increasing the life of tools for ultrasonic cutting made by the Cavitron Equipment Corp., Long Island, N. Y.

The firm adopted the stainless steel tubes — after consultation with engineers of Superior Tube Co., Norristown, Pa.—for use in its Sheffield - Cavitron ultrasonic machine tool. This is a device which vibrates a tip 20,000 times a second against suspended abrasive particles flowing across the work piece. Only slight pressure is required to sink the tool into the work, cutting the material. There is no heat, noise, or gross vibration.

Tubes Brazed Together

Usually a number of tubes are brazed together into a bundle of the same shape as the cut to be made. Previously the tubes frequently warped at brazing temperature, and the tool was rejected. Replacement with type 304 stainless tubing immediately eliminated the warping. At the same time, Cavitron engineers found the stainless tubing better lasting.

The increased tool life is highly important in the ultrasonic process since materials cut are exceptionally hard. Most of them were previously classified as unmachinable except with diamond tools.

Machining Described

Long tool life is particularly important in this application because of the time required to make the complex bundles of tubing. Operators get maximum number of pieces per tool with minimum down time.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 129. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Stainless tube use cut rejects of ultrasonic machine tools.

In the ultrasonic machining, the water-suspended abrasive particles—activated by the rapidly vibrating tool tip—dig out microscopic chips from the material without noise or vibration.

The ultrasonic process involves very low stresses and an absence of local heating in the machining area. As a result, no thermal cracking or pitting takes place, and frangible or heat-sensitive materials can be easily cut.

Methods:

Automatic embosser eliminates hand wiring of tags.

An automatic machine which attaches tying wires simultaneously with embossing fixed and variable data on metal identification tags at the rate of 75 per minute, has been announced as now ready for delivery by Dashew Business

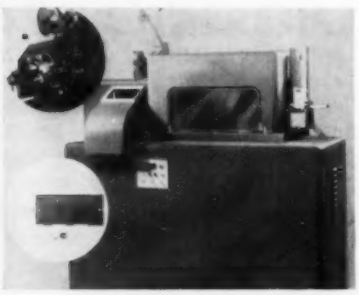
Machines, Inc., Los Angeles, Calif.

The wiring unit is the first completely automatic technique according to Dashew, a firm which specializes in automatic data processing equipment and systems for control and identification of materials, parts and finished products.

With the Databosser and its automatic tag wiring, they state, industry can achieve lower costs and significant new efficiencies through improved controls resulting from more systematic identification of parts-in-process and identification of: raw materials, equipment, parts and finished products involved in storage and distribution.

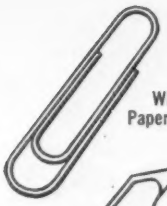
Varied Duties

At the same production speed of 75 metal tags embossed and wired per minute, it is said the Databosser can simultaneously emboss sequence numbers, notch plates for coding or sorting and coat tops of embossed characters for easier reading. Without the wiring operation the Databosser performs all its other operations at the rate of up to 100 tags per minute.



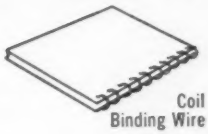
The unit, the wire tier, and the completed wired Dashaplate.

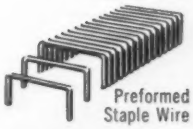
Among other tools for control and identification, Dashew produces "Dashaplates," metal identification tags available in 10 basic coding colors. Shortly to be announced is the Dashew Databosser V100-EW, an embossing machine automatically actuated in all its operations, including type setting, by common language sources such as punched cards and punched tapes.


Wire for Paper Clips

Piano Covering Wire

Whatever your problem is in **Wire...**


Coil Binding Wire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Yes, you can – but it's not *necessarily* the best thing for you.

You want the lowest unit cost – *for the life of the part*, including re-runs. It may well be that our **Machine-Cut Method**, with no die cost, does work out best.

Or, it might better be our **Short Run Method**, using economical blanking dies and stock punches.

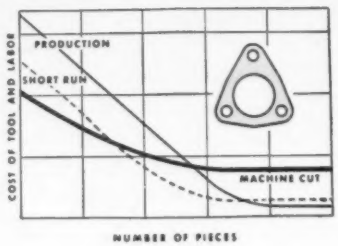
Sometimes, even with very short runs, it pays to use our **Production Method** with a standard die or our own surprisingly inexpensive Hecht-type tool.

In *any* case, the decision is a technical one based on many factors, not just length of run. You save money when the correct decision is made.

WE USE ALL THREE METHODS – LET US MAKE AN IMPARTIAL DECISION FOR YOU

For example, take the part illustrated. From 1-65 parts, our Machine-Cut Method is most economical. At 65 parts, the Short-Run Method is best until, at 7,000 units, the standard Production Method is most satisfactory.

These breaking points as charted vary drastically with every stamping, but the general principle remains the same.



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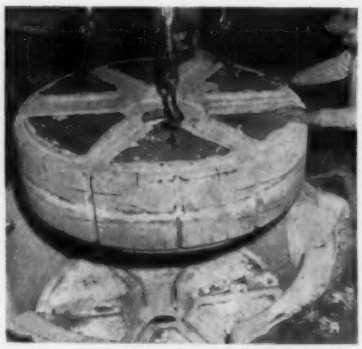
Casting:

Binder developed to aid core and mold production.

A new cold setting binder and the working techniques for its use, developed by G. E. Smith, Jr., Pittsburgh, promises to provide many improvements in the making of sand cores and molds. The binder is a Swiss-developed formulation of oils which, when added to sands in percentages up to 2 pct, produce hard, nondeforming, finished cores and mold surfaces of fidelity.



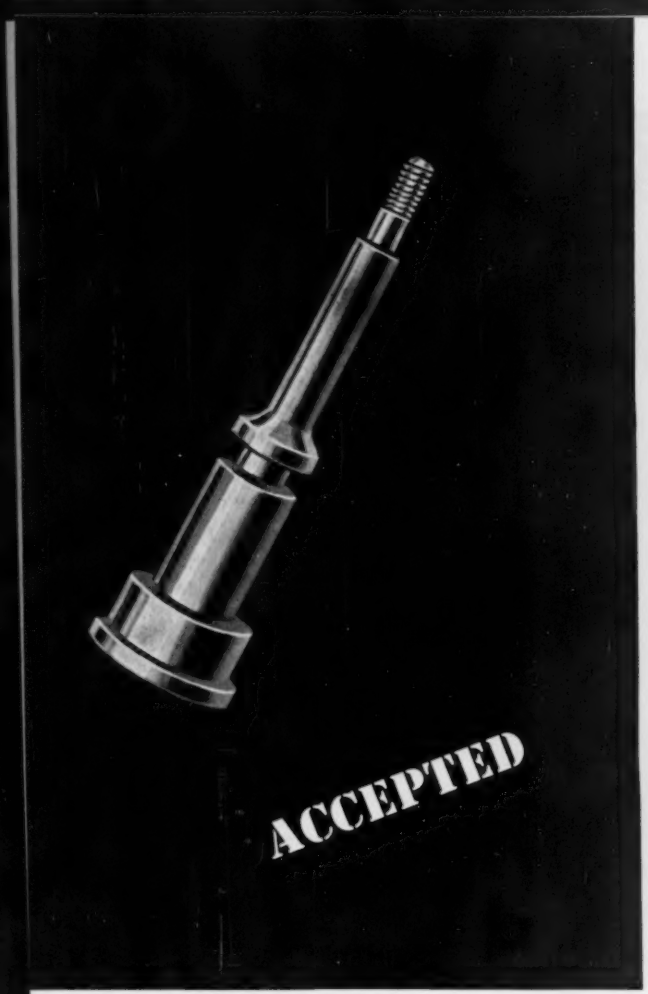
No ramming is claimed for cores made with cold setting binder.

Among the reported advantages of the cold setting binding process for castings of any size are: no ramming of sand is required; 50 to 60 pct of rodding is reduced under normal core making procedures; rough cleaning time is eliminated; core surfaces have uniform hardness; accurate core sizes are maintained; sand life is controlled and sand handling simplified.

Instruments:

Controls preselect complete rolling schedules.

Automatic - positioning screwdown control equipment has just been shipped to England by The Electric Controller & Mfg. Co., Cleveland, for new "H" beam mills now under construction there. The English mills, which are owned by Dorman-Long & Co. Ltd. and located at Middlesbrough, will utilize the two constant potential type



THE DIFFERENCE... *Carpenter* stainless machinability

Here are two reasons why the machining of these seating valves presented a problem in this shop: Tolerances of ± .0005" must be held because they contribute greatly to the operation and service life of the part. Further, the length of the part makes thread cutting on the small end a ticklish operation.

Rejects were running high and costs were excessive when the company was using an ordinary Type 303 Stainless.

Where was the answer? The trouble had to be in the stock . . . yet originally it was thought that the stainless being used would fill the bill. With the trouble at hand, the job obviously called for something better in machinability.

Following this reasoning, the company started to ask questions about easier-machining stainless steels. The answers pointed to Carpenter—originators of the world's first free-machining stainless.

Carpenter Stainless No. 8 (Type 303) was assigned to the job. Now close tolerances are held consistently . . . rejects are considerably reduced . . . and in all other ways the job is a lot easier.

Why be satisfied with "average" stainless steel performance when Carpenter is ready and able to help you? For immediate delivery of the finest Free-Machining Stainless Steels available today, put in a call to your nearest Carpenter Mill-Branch Warehouse or Office. *The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.*

Specify Carpenter . . . the one Stainless Job-Proved to give you:

easier machining
fewer rejects
smoother finishes
lower production costs

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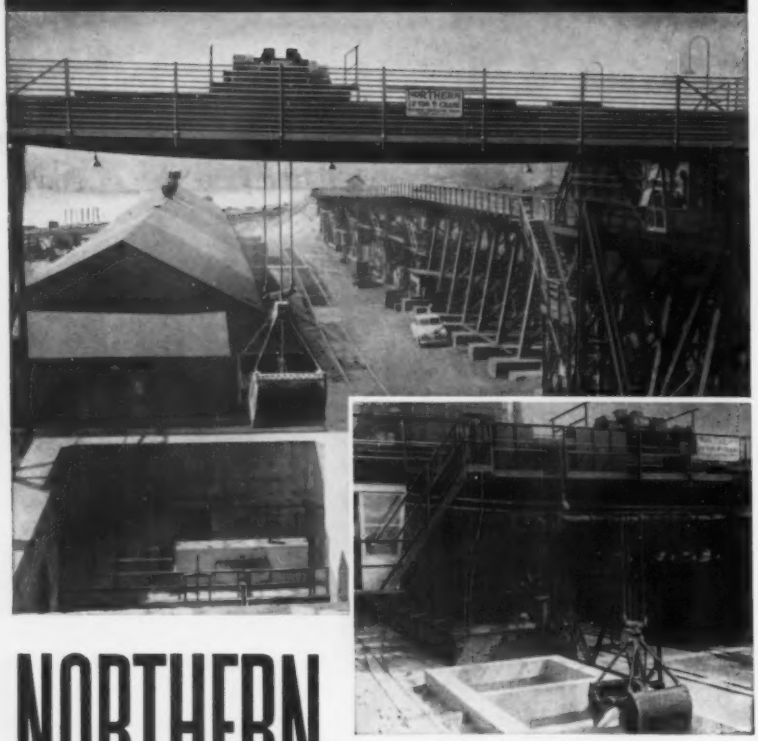
Free-Machining Stainless Steels

IMMEDIATE DELIVERY from local warehouse stocks — Export Address: Port Washington, N. Y. — "CARSTEELCO"

Look Overhead . . . see "NORTHERN"



NORTHERN YARD CRANES

are built for rugged service

All Northern Overhead Electric Traveling Cranes are designed and built to provide the maximum in dependable operation under the most rugged conditions.

High efficiency and minimum maintenance are assured by close tolerance machining of all mechanical parts with turned and ground shafts, press fits of gears, wheels and bearings. Brakes are chosen to allow for extreme overload conditions. Extra heavy structural sections and rigid construction of girders with end trucks insure lateral stiffness, minimum vertical deflection and safe operation when the crane travels at full speed. Heavy duty type motors with anti-friction bearings are combined with especially selected control equipment to assure fine handling.

In plants where bulk material handling is required, as in the steel plant shown above, Northern cranes are a preferred investment for safety, dependability and efficiency.

Write for Bulletin SE-108

MATERIAL HANDLING EQUIPMENT BY NORTHERN

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

automatic-positioning screw-down controllers to schedule automatically separate roughing and finishing operations on beam mills built by the United Engineering & Foundry Co.

Each of the new automatic-positioning screw-down controllers uses schedule panels equipped with slider contacts for pre-selecting complete rolling schedules. Once the easily-adjusted sliders are properly positioned for the desired mill roll openings, the mill operator has only to press a momentary-contact button once for each mill pass. The pressing of this button actuates the horizontal, vertical and edger roll drives of the mill in unison, with automatic - positioning control stopping the drives to give the exact roll separation for the particular pass as called for by the schedule panels.

Coupled to Roll Movement

The positioning of the slider contacts on the schedule panels is facilitated by simple graduated scales, with one main scale and pass-sliders and one vernier scale and pass-sliders provided for each mill pass up to the maximum required—the exact number being dependent upon the particular mill operations for which the individual screw-down controller is designed.

Each controller operates three sets of mill rolls.

The automatic - positioning screw-down controllers are arranged to be coupled to the roll movement of the mill at any point within the mill's capacity, thus making possible automatic roll scheduling for virtually any size beam. In addition, manual control of any or all roll movements

ONE OF A SERIES:

What makes a cylindrical roller bearing good?

RETAINERS

"requirement-engineered" for your kind of service

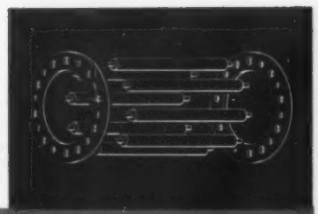
The basic parts of a roller bearing are the rollers, the races, and the *retainer* which locates and guides the rollers. There are significant differences in the design and construction of retainers, which influence bearing cost and performance. Some are simple and economical, well adapted for volume production; others are more costly but insure improved roller guidance, or cooler and smoother operation, or longer heavy-duty service. Beginning with the most elementary, here are the seven basic types in current use.

HYATT MAKES ALL SEVEN TYPES . . . EACH THE FINEST OF ITS KIND! You will find complete details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your requirements. Remember, HYATT is America's *first* and *foremost* maker of cylindrical roller bearings. Hyatt Bearings Division of General Motors, Harrison, N. J.

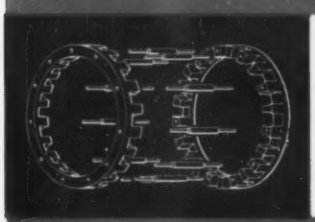
GM GENERAL MOTORS

HYATT

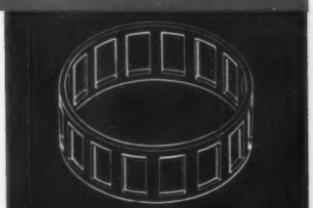
ROLLER BEARINGS



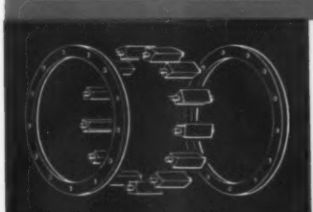
TRUNNIONED ROLLER CAGE—Economical for volume use on thin-annulus bearings. End rings are hardened steel stampings, connected by riveted bars interspersed between rollers to form an integral unit. Races can be omitted if desired.



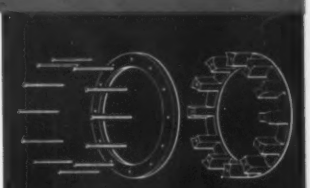
POCKETED END RING CAGE—Designed for fairly large bore bearings in heavy-duty service. Rollers are guided accurately by pockets drilled in bronze end rings. Riveted connecting bars form an integral unit, so races can be omitted if desired.



STAMPED STEEL SEPARATOR—Economical for volume use on wide range of bearings with short rollers. A single steel stamping with bars coined to conform to roller contour. Simple, open design assures large lubricant capacity and good circulation.

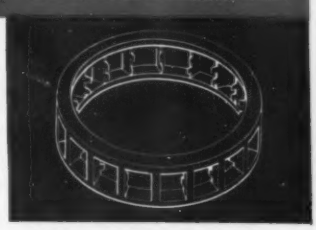


FORMED BAR CAGE—Well adapted for volume use on heavy-duty bearings. Hardened steel end rings are connected by cold-rolled shaped bars conforming to roller diameter. Insures quiet operation, better roller guidance, and the smooth surface of bars protects rollers.



DRILLED POCKET CAGE—Used on better-grade bearings to provide extremely close control of rollers, which operate in pockets drilled and reamed in bronze cylinder. Riveted ring on one end retains rollers permanently, so races may be omitted if desired.

SEPARABLE BROACHED POCKET CAGE—Used only on finest high-speed bearings. An integral bronze cylinder with pockets broached for maximum uniformity. Insures minimum friction, better oil circulation for cooling. Rollers can be removed for inspection.



NON-SEPARABLE BROACHED POCKET CAGE—Similar to the above and offers all the same operating advantages. Used for "blind" installations where rollers must be retained with inner or outer race. Roller drop controlled by deforming bars after rollers are placed.

it's the greatest advancement in OBI press history

NIAGARA FRONT-TO-BACK

ALL NEW rugged, front-to-back crankshaft with huge crankpins
ALL NEW compact, fully concealed driving mechanism
ALL NEW enclosed, rigidly supported gearing in sealed oil bath
ALL NEW electro-pneumatic friction clutch on crankshaft
ALL NEW wider spaced, longer, narrower gibs
ALL NEW wider, box type slide all within gibbing
ALL NEW precision, hardened, longer-wearing gears
ALL NEW compact, straight-line, space-saving frame

Hailed as the greatest achievement in modern OBI press design and performance, by over 100,000 spectators who examined this mechanical marvel at the Machine Tool Show, the all-new Niagara Series E, Single Point, Open Back Inclinable Press starts a brand new chapter in press history.

It's years ahead of any OBI ever built. It's an industrial revolution all by itself. No other press, in modern times, embraces so many "All-New" features.

Gone are exposed, overhanging gears, flywheel and other mechanisms. Gone is excessive and damaging crankshaft deflection. Here to stay are: Full support to wide dies. Greater resistance to off-center loading. Accurate alignment of slide, with minimized tendency to cock. Substantially increased die life. Longer lasting, hardened gears. Smoother, safer press performance. Smaller floorspace requirements.

Built in 4 sizes, with shaft diameters from 4½ to 7½ inches and capacities from 75 to 200 tons, the new Series E is available in both standard models and automation models equipped with the most advanced controls and devices for peak production. A complete description of both, with full specifications, is given in new Bulletin 56, sent promptly on request.

SEND FOR NEW BULLETIN . . .

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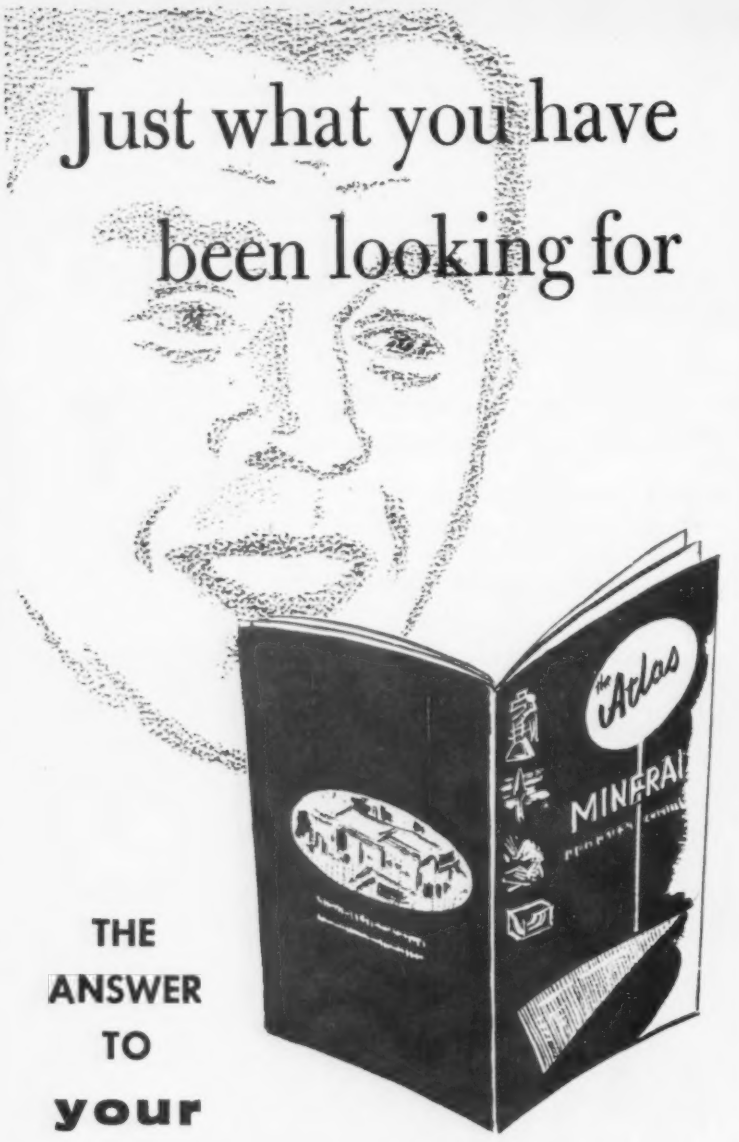


THE ANSWER TO your corrosion problems

A completely new sixteen page bulletin on corrosion proof materials of construction. . . . Individual sections on CORROSION PROOF CEMENTS, PROTECTIVE COATINGS, TANK LININGS and RIGID PLASTIC STRUCTURES and PIPE . . . also sections including engineering design and corrosion resistance charts.
This bulletin is filled with valuable information on 18 materials that can be used to give you plant-wide protection from corrosion.

FOR YOUR COPY
WRITE TO

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

TECHNICAL REPRESENTATIVES THROUGHOUT THE UNITED STATES

is instantly available to the operator by means of a master switch which cuts out the operation of the automatic positioning control.

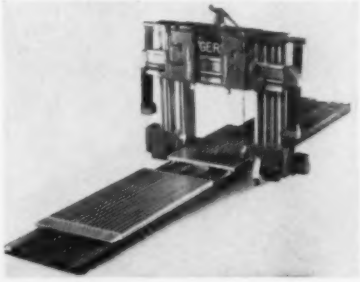
This automatic control, however, remains coupled to the roll movements during manual operation, so the operator can return to the pre-selected rolling schedule whenever he desires. If manual control is used to finish the rolling which was first started using automatic positioning, a button is provided for resetting the automatic control to the No. 1 pass on the schedule panels.

Machine Tools:

Large rail miller readied for installation.

A large adjustable rail milling machine, weighing 1,230,000 lbs., will soon be installed at the General Electric Co. Steam Turbine-Generator plant in Schenectady, N. Y.

The 18½-ft x 17-ft x 54-ft wide machine (claimed to be the world's largest) is being built by the Ingersoll Milling Machine Co., Rockford, Ill. Purchase of the machine as well as the special construction of the foundation to support it will represent a total investment of more than $1½-million.

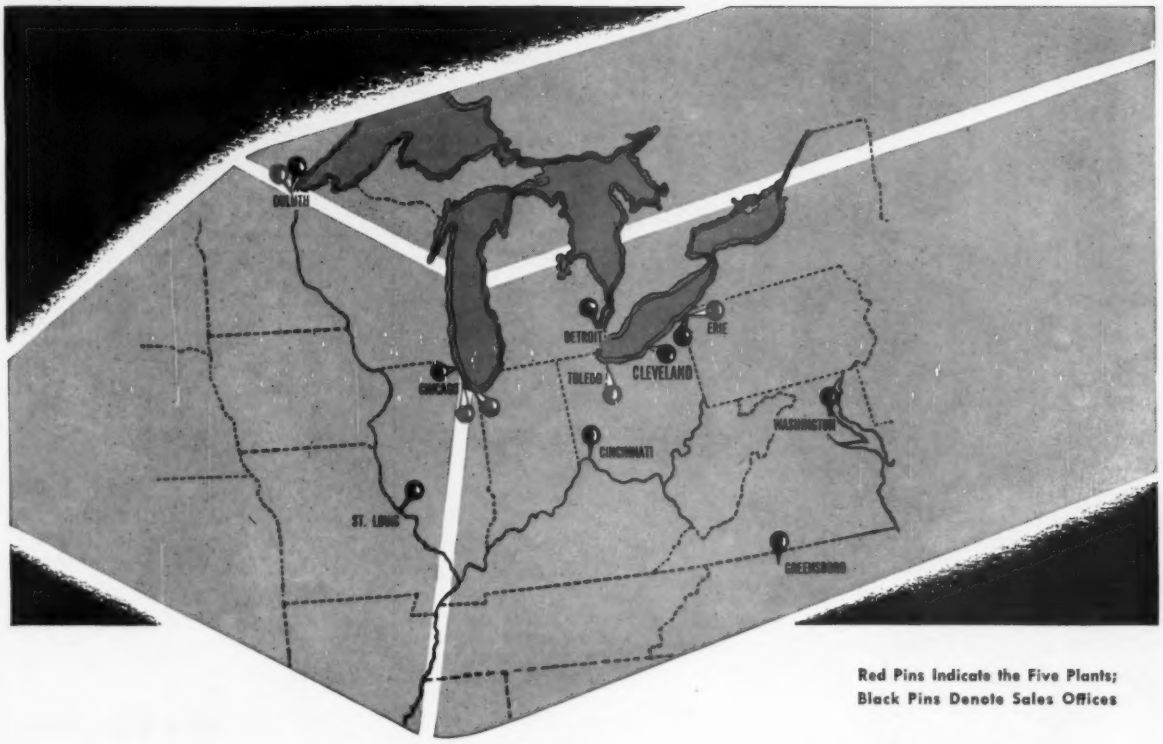


Model of miller. Figure represents man 5 ft, 6 in.

Machines 18 ft. Work

The machine will be 120 feet long, stand 35-feet 2-inches high, and will be 42-feet 1-inch wide. It will be capable of machining work pieces up to 18 feet wide and 16½ feet high. It was especially designed for machining large parts of G-E's steam turbine generator units.

Turn Page



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Black Pins Denote Sales Offices

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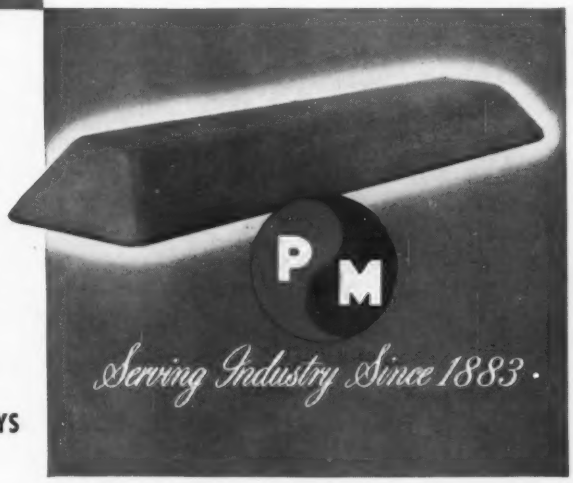

Before you hang up,

your order for alloy steel bars, billets and forgings, in whatever size, shape and treatment you need, is well on its way to being filled.

All seven of our modern warehouses are located in principal industrial areas... near you. Each one is well-stocked: equipped to fill your alloy steel requirements promptly, whether you need standard AISI, SAE or our own special HY-TEN steels—"the standard steels of tomorrow". Every warehouse, too, is staffed with experts in metallurgy who are ready to serve you.

Write today for your FREE copies of Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

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WHEELOCK, LOVEJOY & COMPANY, INC.

126 Sidney Street, Cambridge 39, Massachusetts

"Four 100 hp motors will drive milling heads . . ."

Four 100 hp motors will drive the individual milling heads. Two 17½-ft-wide work tables, one of them 22-ft and the other 34-ft long, will operate on a 112-ft long bed. Use of the two tables separately will allow setting up or unloading one work piece while another work piece is actually being milled on the other table. For very large work, the tables can be joined and used as one.

There is a span of 18 ft between the spindle noses, and a height of 16½ ft from table to the rail head spindle noses. It is estimated that this machine can do work equivalent to three 16 ft planers. Present plans call for the machine to be in operation by mid-1956.

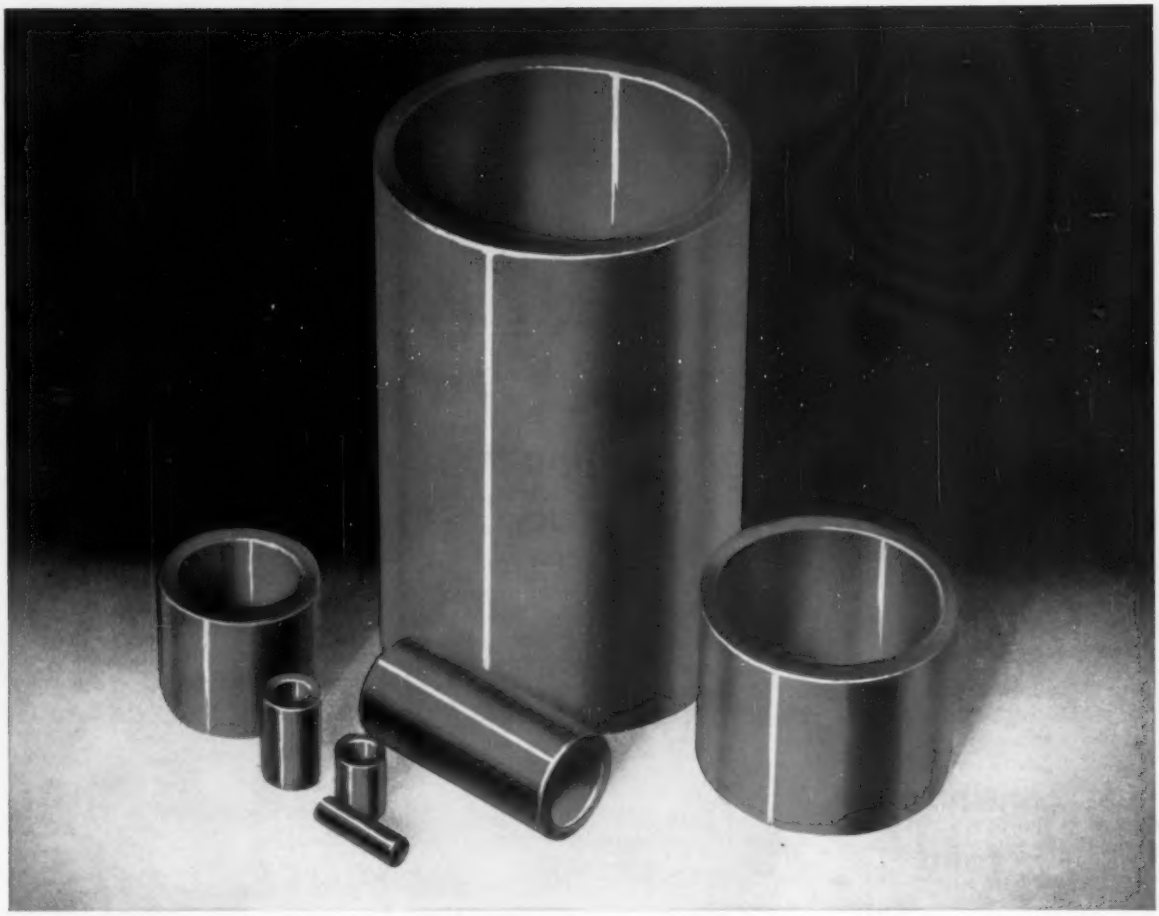
Methods:

Young inventor combines T-square, triangle and ruler.

An easy-to-use drafting tool which unites a T-square, a triangle and a ruler in one has been developed by a 16-year-old inventor. The device, known as a K-Square, contains a traveling centerpiece to which is attached a slide adjustable over the entire range of 360°. This permits the drawing of lines at any desired angle over the entire range of 360°, permitting lines to be drawn at any desired angle to the horizontal.

The unit was designed by Larry

Drafting tool permits drawing lines at angles in 360° range.



From the smallest to the largest

Your Savings Are Big

with Johnson Standard Sleeve Bearings

Your opportunities for substantial savings are BIG when you include Johnson standard sleeve bearings in your plans for manufacturing new equipment. They are made in volume from general purpose alloy and you can get them quickly from large stocks maintained by Johnson distributors everywhere. You pay no tool and die charges when you use standard bearings. The economy of producing and shipping them is passed along to you. In addition, the savings in time made possible by having stocks available often mean you can go into production faster.

Your design is not limited with Johnson standard sleeve bearings, for they are made in over 900 sizes—more than 200 combinations—inside diameters range from $\frac{1}{4}''$ to $4\frac{1}{2}''$, will fit 47 different shafts—outside diameters range from $\frac{3}{8}''$ to $5''$ and will fit 204 different housings—lengths range from $\frac{5}{8}''$ to $9\frac{3}{4}''$. The alloy is Johnson 72 (SAE 660) which was selected to give the greatest resistance to wear and pounding with minimum reduction in plasticity value. These standard bearings may be altered quickly and economically with oil holes, slots and grooves—even flanged, where it is necessary to overcome thrust.

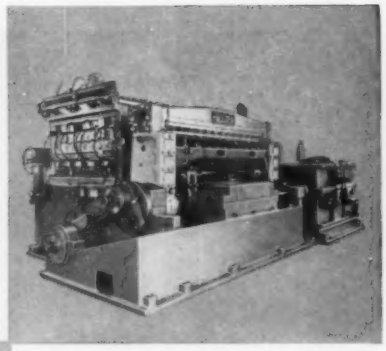
Johnson is also a prime source for Universal bronze bars, Ledaloyl powder metallurgy bearings, electric motor bearings, and graphited bearings which are available in a wide range of sizes from stock.

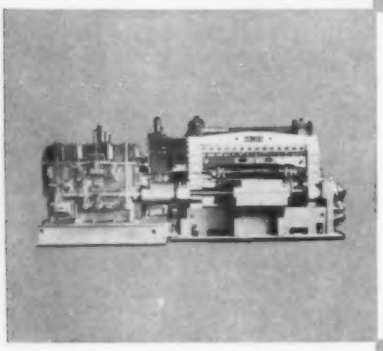
For information on how you can enjoy the economy of Johnson standard sleeve bearings, ask your distributor or write for bulletin which contains a chart giving details of size range and data on other stock bars and bearings. Johnson Bronze Co., 505 S. Mill St., New Castle, Pa.

Johnson Bearings

Sleeve Bearing Headquarters

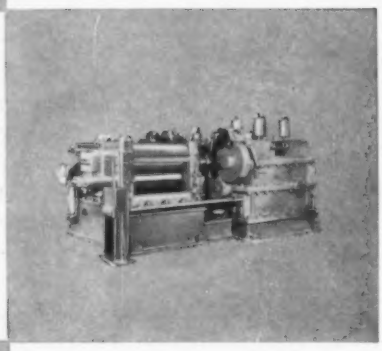
flexible design

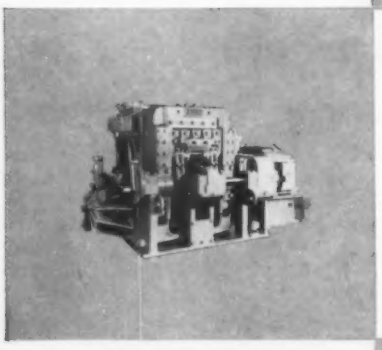




cutting accuracy

continuous feed





rugged construction

Automatic Shears

by HALLDEN

"the shearing specialists"

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(Ferrous & Non-Ferrous)

Kalmis, a high school senior in New York City, who is a member of Junior Achievement, Inc. This organization enables youngsters to form and operate their own businesses with the counsel and guidance of older businessmen.

Found Accurate

The inventor explains he first started thinking about the invention when he was 14. "I used to find it cumbersome to pick up a T-square and then a protractor and a triangle when I was in drafting class," he says. "I thought a combination tool could be made that would replace the individual drafting tools."

The research department of American Machine & Foundry Corp., cooperating in Junior Achievement work, studied Larry's invention and found its accuracy equivalent to the drafting tools it was invented to replace. An application for a patent followed a patent search. Now it is expected the drafting tool will soon be ready for sale.

Testing:

NBS announces six new stainless standards.

The National Bureau of Standards has announced the availability of six new standard samples of stainless steel. The samples, carefully analyzed and certified for composition, are designed for calibrating and checking spectrochemical methods of analysis. Together with a set of three spectrographic standards issued earlier, NBS standards now provide certified concentration values for determining most of the elements encountered in the analysis of stainless steels.

The new stainless steel standards are certified for concentrations of six major and minor elements: manganese, silicon, copper, nickel, chromium, and molybdenum. Samples are available in two forms: rods 7/32 in. in diam and 4 in. long, and rods ½ in. in diameter and 2 in. long. Both of these rods serve as electrodes for spark excitation in spectro-chemical analysis.

Turn Page

HOUGHTON CAN HELP YOU WITH YOUR SURFACE TREATMENT PROBLEMS

PICKLING ——— Acitrol, the new, more efficient pickling inhibitor, withstands high temperatures for long periods—saves acid, saves steel, produces a better pickled finish.

CLEANING ——— In addition to a full line of alkaline, acid and emulsion cleaners, and detergents, Houghton offers the new Houghto-Clean Cold Cleaners for both production line power washers and still tank cleaning.

PHOSPHATING — Both iron and zinc phosphate coatings: Houghto-Clean 313A is a highly efficient cleaner that produces an iron phosphate coating on the metal . . . aids paint adhesion. Houghto-Phos is a zinc phosphate treatment for subsequent drawing or painting operations.

BLACKENING ——— Houghto-Black, a one-step metal blackening product that is easy to use—imparts a lustrous, durable finish.

PROTECTING ——— Houghton, the pioneer in rust prevention, has a complete line of Rust-Veto rust preventives for short term or long term protection of metal surfaces against rust and corrosion.

Whether your problem involves surface treatment of metal prior to further processing, or protection against rust and corrosion, or a permanent, attractive, saleable finish, there is a Houghton product and process that can profitably meet your need. Ask your Houghton Man for help on any one or all of these metal surface processes. E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33, Pa.

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TO START YOUR FREE "NELWELDER" SUBSCRIPTION

Complete photo of the muscle man appears on the front cover of the February "NELWELDER", industry's magazine of stud welding.

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one sure way of proving...

NELSON STUDS STAY PUT!

Test it yourself . . . apply brute strength to an end-welded NELSON stud, and you'll destroy the stud before the weld gives way . . . it stands up under shock, impact, vibration and tension.

Further proof of strength is the increasing number of engineers and architects who are putting NELSON studs up to 1⅛-inch diameter to work in heavyweight jobs. How they are used to fasten better at less cost is revealed monthly in the "NELWELDER", the magazine of stud welding. To start your free subscription, mail us the top of this advertisement.

NELSON STUD WELDING
Division of Gregory Industries, Inc.
LORAIN, OHIO

The three stainless steel standards issued previously are certified for nine trace elements: aluminum, boron, copper, molybdenum, niobium, lead, vanadium, tungsten, and zinc. These are available in the form of rods 7/32 in. in diam and 4 inches long.

Several Years Work

Since spectrochemical methods of analysis are both fast and accurate, such methods have been increasingly applied to the analysis of complex steel alloys. Anticipating the growing need of industry for suitable standards, the Bureau began preparing the stainless steel samples several years ago. Six heats of metal were contributed by the Uddeholm Co. of Sweden, which prepared the steels to desired composition and fabricated the metal into rods. A grant from the American Iron and Steel Institute assisted the Bureau in homogeneity testing and analysis.

The rods have a uniform grain structure resulting from hot-rolling and annealing the cast metal. The surfaces of the rods were finished by centerless grinding. The homogeneity of the rods, both in cross and longitudinal sections, was studied by spectrochemical analysis at the Bureau and was found satisfactory with respect to the concentrations of the certified elements.

Plastics:

German coating process licensed in U. S.

A new method of coating metals, ceramics, glass and wood with various types of plastic materials has been developed to combine the natural advantages of the plastic materials with those of the parent materials to be coated.

The new process, licensed exclusively by the Polymer Corp., Reading, Pa., was invented in Germany by the firm Knapsack-Griesheim A. G. of Frankfurt-am-Main under the name whirlsintering. It will be known in the United States as the whirlclad process.

Preliminary experience has been based largely on the use of nylon

POP'S school of filing

MAIL'S JES' BRUNG POP'S COPY O' THUH NEW FILE FILOSOPHY
HE'S ALL WRAPPED UP IN IT LIKE IT WUZ UH WOOLEN STRING WID NO END!
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File Filosophy
STAN RANDALL

For many years Nicholson File Company's "File Filosophy" has been a master key to *lower filing costs, higher working efficiencies* and *increased mechanical efficiency.*

Now this most widely used manual on files and filing has been revised-and-polished with up-to-date changes and more pages—including an added chapter on selection and use of Rotary Files and Burs, of special interest to Industry.

With today's multiplicity of metals and alloys, accuracy and speed in production and assembly-line operations make the use of *The right file for the job* increasingly important.

Nicholson's wide range of job-tested Special Purpose files makes this book especially useful to production engineers and shop foremen, as well as to management and purchasing heads.

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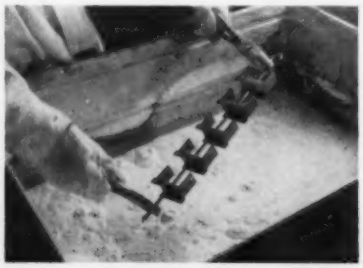
and low-pressure polyethylene as the coating mediums. However, many other materials can be used which melt sufficiently below their degradation temperatures. These include polystyrene, cellulose acetate, butyrate, acrylics and epoxy resins.

Used on Wear Parts

The process is said to permit use of coating materials which never before have been applied satisfactorily. The polymers used are prepared in finely divided solid form especially for the process, but are essentially pure in that they normally contain only minor modifying agents. No plasticizers or solvents are required.



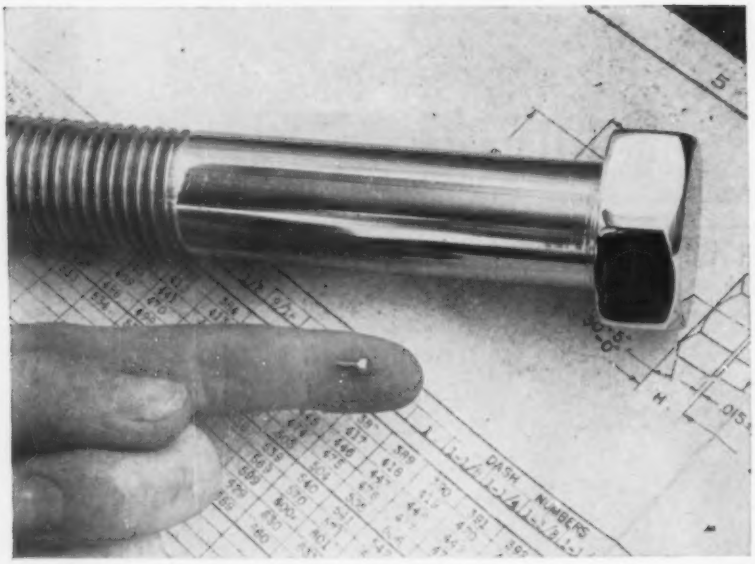
Dipping metal parts in fluidized bed of nylon.

Earliest applications for the coatings include wear parts such as jigs and fixtures, rollers, bushings, loading hooks, sliding surfaces and in corrosion resisting parts such as household appliance racks, plating hooks, valve bodies, fans, ducts and small containers. The company is conducting extensive research to broaden uses with many other parts and components.

Apparatus Inexpensive

The method is reported to require relatively inexpensive apparatus. It consists essentially of dipping preheated articles into a fluidized bed of plastic material in finely divided solid form. Much heavier coatings can be obtained with a single dip than is customary with solvent coating methods.

The melting point of the material to be coated must be higher than that of the coating material. Very satisfactory adhesion is obtained.



ALLMETAL'S HEX HEAD STOCK spread includes 2-56 x 3/16 cap screw (1/100 oz.), and 1¼-7 x 7½ bolt (a weighty 3 lbs., 1 oz.). Between these two extremes, 497 different hex head bolt sizes are carried in stock.

WORLD'S LARGEST STAINLESS FASTENER STOCK AT ALLMETAL

Leading manufacturers launched a switch to a fast growing firm (specialists in stainless steel) for their fastener supplies. They found that there's no stock like the largest, and Allmetal Screw Products Company has the largest stock of stainless fasteners in the world.

One significant reason manufacturers find Allmetal stainless fasteners so fascinating is their hex head bolt stock (see cut). And talent to follow through with fast delivery of screws, nuts, washers, rivets, pins, nails, and "AN" fasteners.

Chief cause for Allmetal's ability to turn out fasteners — and have them ready for immediate shipment — is their spanking new plant in suburban New York (Garden City, Long Island). These added facilities — plus 26 years of specialization in tough alloys — give Allmetal the combination to supply stainless fasteners when needed. Stock list brochure available.

MANUFACTURERS SINCE 1929
ALLMETAL
SCREW PRODUCTS COMPANY, INC.
GARDEN CITY NEW YORK

Use WELDED STEEL for Greater Strength with Less Weight!

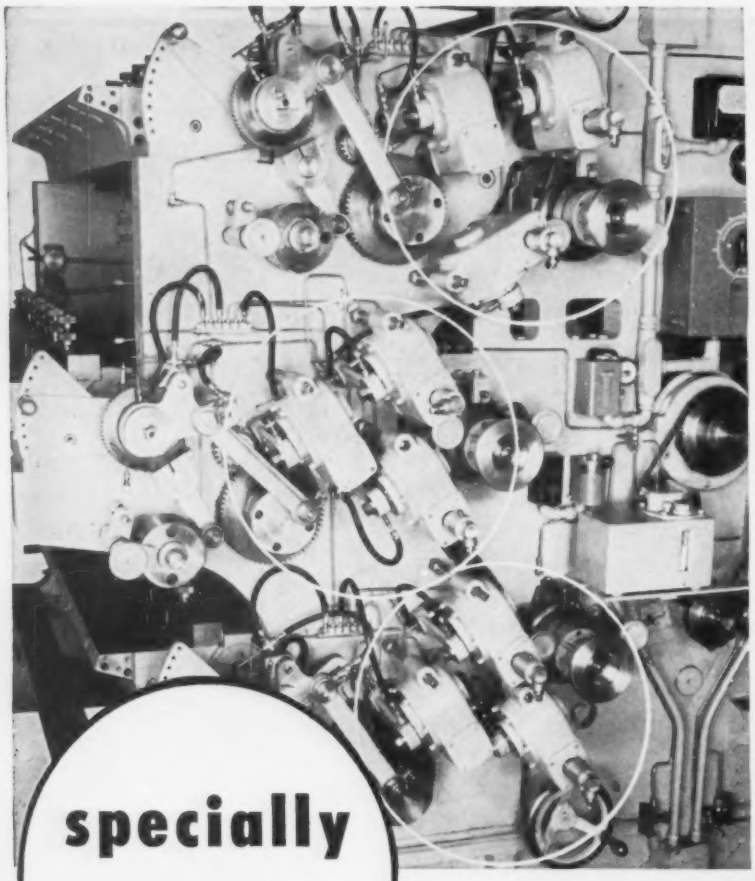
Illustrated above is one of two Walking Shoes for a large wheel excavator employed in strip mining operations . . . it is one of many heavy parts and assemblies of parts fabricated and machined by Mahon for manufacturers of several types of mammoth earth moving machines. If you can use weldments to advantage in your product, you can turn to Mahon for complete service including design or redesign, fabrication, machining and assembling. Steel-Weld Fabricated parts and products shown at left are typical of thousands produced by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. If you need weldments, or welded steel in any form, you will find a unique source in the Mahon organization . . . a source where design skill and advanced fabricating techniques are supplemented by craftsmanship which assures a smoother, finer appearing product embodying every advantage of Steel-Weld Fabrication. See Sweet's Product Design File for information, or write for Booklet showing Mahon's facilities to serve you.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago

Engineers and Fabricators of Steel in Any Form for Any Purpose

MAHON



specially designed...

This close up photo shows installation (circled) of OHIO Speed Reducers. Note the angle mounting of each reducer.

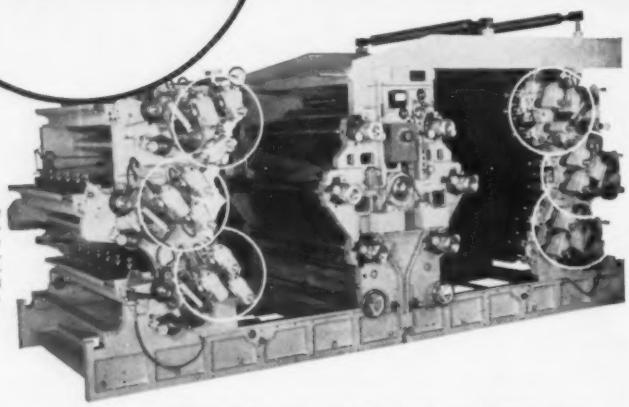


Illustration at the right pictures a complete unit and the location and operation of 18 OHIO Speed Reducers.

. . . speed reducers that are rugged, durable, and trouble-free have convinced engineers to depend upon Ohio Gear. Design engineers at Paper Converting Machine Company of Green Bay, Wisconsin worked with Ohio Gear in developing the special Speed Reducers for their new Multicolor Rotary Rubber Plate Letterpress. Special speed reducers are an all important factor in the operation of these 6 color presses where color control and accurate register are essential for process printing.

Ohio Gear can help you design a special reducer for your application where a standard unit will not do the job. Let us help you with your special gearing problems.

ESTABLISHED 1915

OHIO GEARS

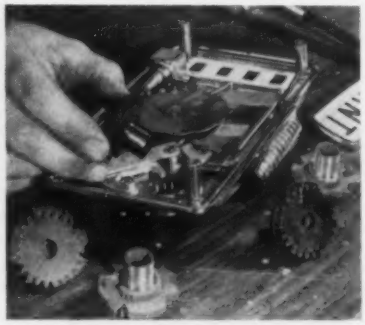
OHIO GEAR COMPANY • 1366 East 179th Street • Cleveland 10, Ohio

Castings:

Beryllium copper parts give durability, accuracy.

In discussing the cast beryllium copper parts used on Viking Tool Corp's, taximeters, a company spokesman states they are using beryllium copper castings because of the inability of other metals and alloys to hold up under the company's durability and accuracy standards.

This stems, he reports, from the fact that beryllium copper possesses ideal casting characteristics and yields an end product consistent with original mold design. Close tolerances of 0.005 in. can be achieved with beryllium copper without additional machining in most cases. The taximeter,



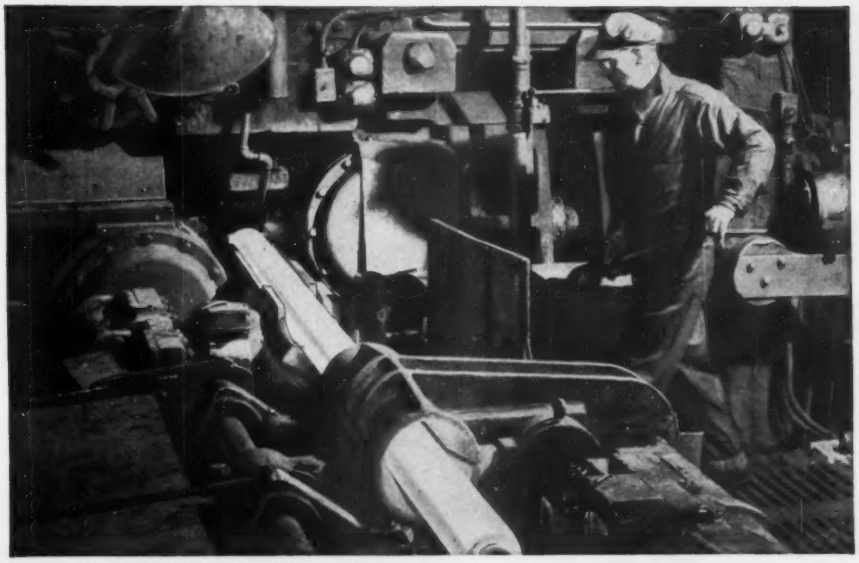
Intricate taximeter parts are beryllium castings.

with only 38 moving parts, uses an electrically wound clock instead of a maze of gears and springs to accomplish dial movements. Most of the gears and cams used in the meter, must of necessity, bear against steel pins and shafts. Viking has found that other castings do not have the hardness necessary to maintain dimensional stability under the prolonged strain of day-in-day-out meter service.

The flag indexing cam is the pivotal unit by which the entire sequence of meter operations is initiated, and it is one of the most complicated single-cast parts ever produced . . . it has lobes, teeth, ratchets, cams, a square tapered hole, and a disengaging stop. The tapered flag socket measures 0.628 in., with a tolerance of −0.005 in. and + 0.00 in.

use 'dag' dry films for trouble-free lubrication

dag
DISPERSIONS®



How to extend productive life of piercers, punches, dies

Lubricate these tools with **'dag'** Colloidal Graphite . . . the resultant non-galling *dry lubricating film* easily bears the heat and pressure of these rigorous operations.

As cooling-water is sprayed on the tools between strokes, a graphoid coating protects them against the corrosion which normally attacks hot, wet, steel surfaces. The graphite treatment also reduces shearing friction, producing smoother finishes to closer tolerances so that subsequent machining operations are frequently unnecessary.

'dag' dispersions are also used profitably in forging, stamping, deep-drawing, casting, stretch-forming and wire drawing, for which conventional lubricants are inadequate. There are a surprising number of ways in which **'dag'** Colloidal Graphite can be used in your metalworking operation. Write for our free booklet containing typical applications, Bulletin No. 426-Y2.

ACHESON COLLOIDS COMPANY
PORT HURON, MICHIGAN
...also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

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BETTER
STAINLESS STEEL STRIP

SPECIFY
WALLINGFORD

Modern machines, advanced atomic and electronic quality control devices and quality-conscious personnel make WALLINGFORD STAINLESS STEEL STRIP *better* . . . and make the manufactured product *better.*

Better strip means better output, too. WALLINGFORD STAINLESS STEEL STRIP gages uniformly, draws easily, punches cleanly . . . to reduce spoilage and tool costs.

• THINNESSES TO .002" • ACCURACY TO ± .0001" • SPECIAL SECTIONS ROLLED TO YOUR EXACT DESIGN

A visit to our offices and plant will convince you that Wallingford quality is unmatched.

THE
WALLINGFORD
STEEL CO
WALLINGFORD, CONN., U.S.A.

STAINLESS • ALLOY • HIGH CARBON • LOW CARBON
STRIP • STAINLESS WELDED TUBES AND PIPE

Fabricating:

Sheets of gold welded into nuclear vessel.

Ten sheets of gold, weighing about 25 pounds and valued at $14,140, will be welded by Nooter Corp., St. Louis steel and alloy fabricator to form a pressure vessel for an experimental project of the Atomic Energy Commission. It is

Sheet of gold for use on AEC pressure vessel.

said to be the first time that a boilermaker like Nooter has welded a tank of this size from the precious metal. The shipment is believed by bank officials to be unique in the history of St. Louis.

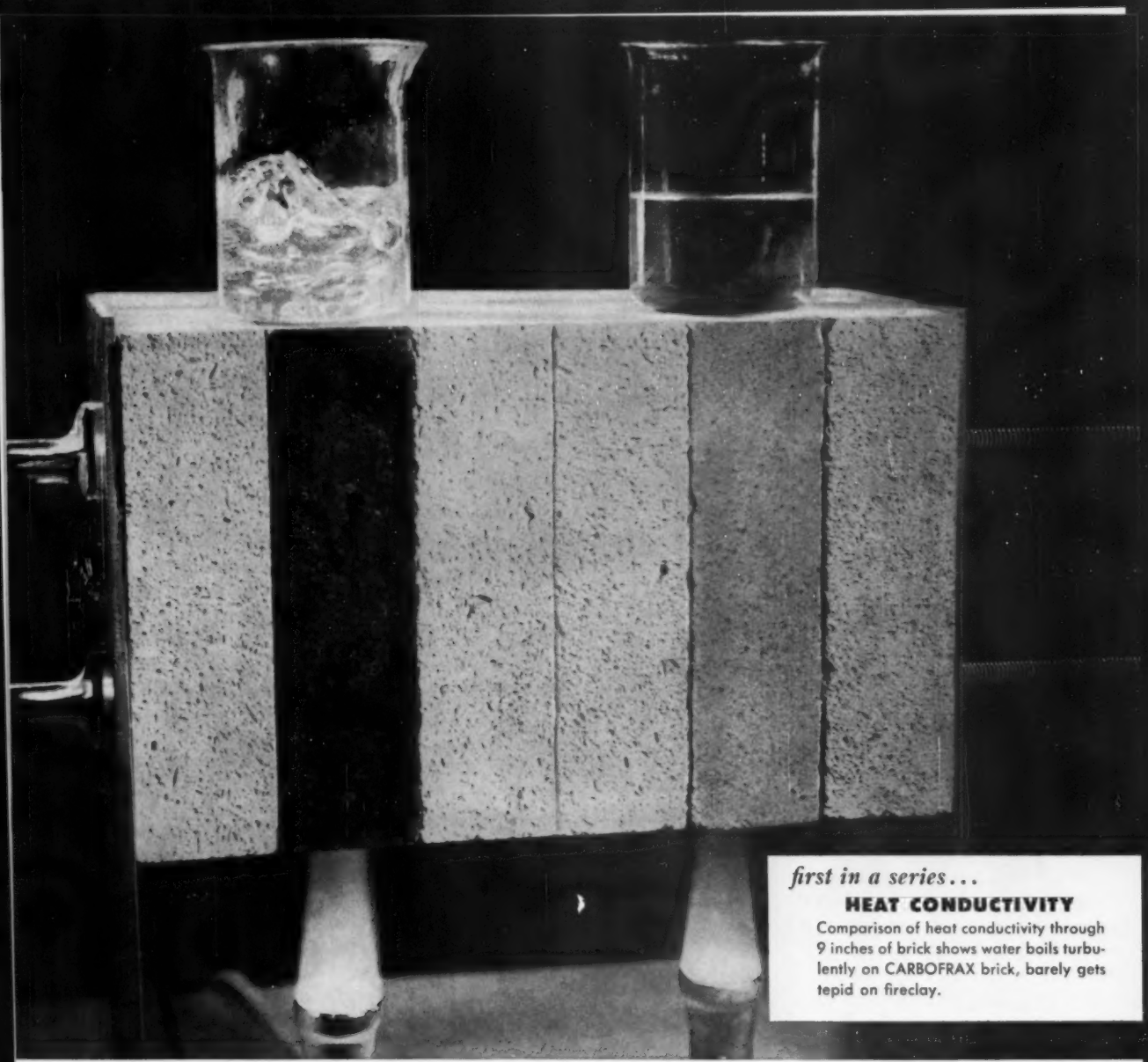
Sheets vary in size from 3 in. in width to more than 4 ft in length, and were from 10 to 15 thousandths of an inch in thickness. They were ordered from Handy and Harman, New York, a dealer and refiner of precious metals.

Forming:

Roll-forged steel rings machine well.

Three roll-forged steel rings form an important part of the drive mechanism of each of four circular sludge collectors being built by Link-Belt Co. at its Colmar, Pa., plant for the Ashburton Filtration Plant, Baltimore.

Hot forged and heat treated at the Burnham, Pa., plant of the Standard Steel Works Div., Baldwin-Lima-Hamilton Corp., the



first in a series...

HEAT CONDUCTIVITY

Comparison of heat conductivity through 9 inches of brick shows water boils turbulently on CARBOFRAX brick, barely gets tepid on fireclay.

Unusual Properties of Refractory Materials

High heat conductivity — roughly 11 times that of fireclay and about 70% that of chrome-nickel steels — is one of the properties of CARBOFRAX® silicon carbide refractory brick. It is an ideal material for muffles, radiant tubes, retorts and similar structures where you need exceptional resistance to direct flame *plus* the ability to conduct heat efficiently. At 2200°F, thermal conductivity of CARBOFRAX brick is 109BTU/hr., sq. ft. and °F/in. of thickness.

CARBOFRAX refractories typify the many super refractories pioneered by Carborundum. Each has a wide range of properties. One, for example, is formed into precision parts that look like cast iron yet resist over 3000°F. Another, a new ceramic fiber, filters and insulates at temperatures no existing mineral or glass fiber can take.

Carborundum's new magazine "Refractories" pinpoints many practical applications for these unusual products. The forthcoming issue carries a feature article on "Heat Conductivity". Send for your copy today.

CARBORUNDUM

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all in the new magazine "Refractories"

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The Carborundum Co., Perth Amboy, N. J.

Please send me the forthcoming issue of "Refractories".

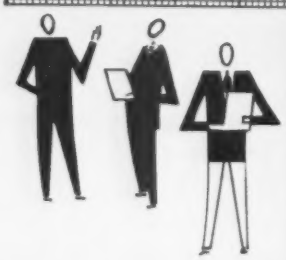
Name_____ **Title**_____

Company_____

Street_____

City_____ **Zone**____ **State**_____

Logan Roller Conveyor speeds production in this prominent diesel engine plant. Engine parts are handled quickly and easily through successive machining and inspection operations. Here cylinder heads are fed via curve in foreground to washer, then water-tested on line in rear.



The LEADERS use Logan

Large business or small . . . you can be a leader in your field, with a properly equipped plant. The nation's foremost industries use Logan Conveyors as part of their equipment for (a) greater speed in production, (b) greater capacity in the same plant, (c) the ability to make quicker deliveries, (d) the conservation of man power, (e) the maintaining of satisfaction among workers. Put Logan to work for you, too. Write for nearest engineer or for further information.

LOGAN CO., 545 CABEL ST., LOUISVILLE 6, KY.

Logan Conveyors

three rings were reportedly specified because of design advantages, lower cost, faster delivery and the quality of the forgings.

Link-Belt engineers say that the uniform machinability of the forged rings has resulted in lower machining costs, contributing in turn to overall lower costs.

Uniform machinability is cited as advantage of dryer rings.

One of the forgings, a gear blank, 122 in. OD x 118 in. ID x 8½ in. wide is machined into an internal gear with 177 teeth, 1½-in. diam pitch. Forged from SAE 4140 steel, the gear has a Brinell hardness of 223/262.

The other two forged rings become the upper and lower ball races for the bearing in which the gear functions. The upper race is 129 in. OD x 123 in. ID x 1⅜ in. wide; the lower race is 129¼ in. x 123 in. ID x 1⅝ in. wide. Steel in both rings is 0.60 to 0.80 pct carbon, not over 0.75 manganese, 0.05 phosphorus, 0.05 sulphur, 0.15 to 0.25 pct silicon. Brinell hardness of the heat treated forgings is 220 to 240.

Handling:

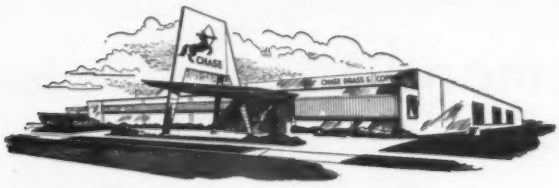
Casting firm ups storage by 300 pct. with fork lifts.

By installing a materials handling system involving the use of fork lift trucks and job-planned accessories, Arrow Aluminum Castings Co., Cleveland, maker of components for the automotive, aircraft, and appliance industries, has tripled its storage capacity, reduced costs and greatly simplified its materials handling operations.

For carrying sand, loading cores, unloading ingots and trans-

CHASE®

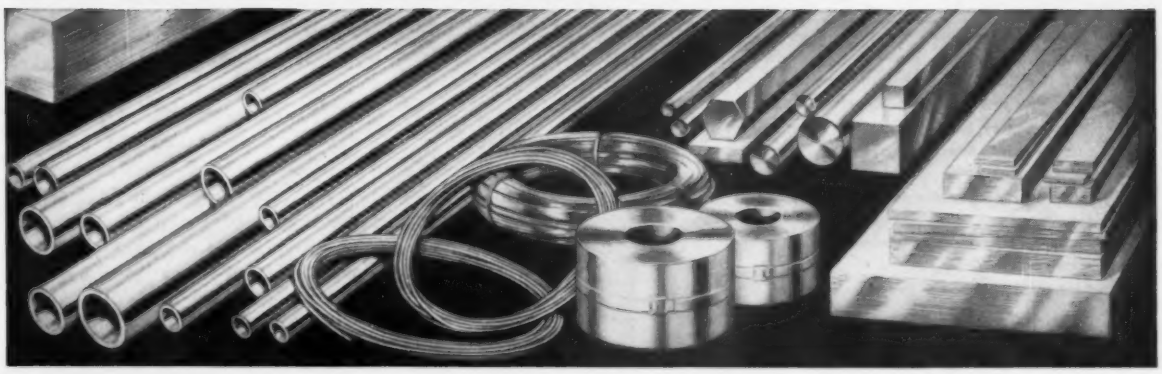
IS THE



PLACE

Illustrated above: Just three of the 25 efficient Chase warehouses dotting the nation.

FOR STAINLESS STEEL!



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BRASS & COPPER CO.

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The Nation's Headquarters for Brass & Copper (†sales office only)

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Baltimore	Cincinnati	Detroit	Kansas City, Mo.	Newark	Pittsburgh
Boston	Cleveland	Grand Rapids†	Los Angeles	New Orleans	Providence
Charlotte†	Dallas	Houston	Milwaukee	New York	Rochester†
St. Louis	San Francisco	Seattle	Waterbury		

porting aluminum castings of various size and shape, including units weighing over 1100 lb each, the firm now uses two Towmotor fork lift trucks, manufactured by Towmotor Corp., Cleveland. Interchangeable attachments, which include fork extensions and a handy shovel-type scoop accessory, give flexibility to the company's improved materials handling program.

Fork Lifts Move Ingots

The company has found its fork lift trucks suited to the special requirements of regular plant operations, and to many other occasional jobs, such as the moving of heavy machinery. Both loading and unloading operations were formerly done by hand. Now, when aluminum ingots weighing 30 lb each arrive by railway car at a siding located one-half mile from the plant's storage area, one of

Versatile fork lifts improve materials handling system.

the Towmotors is placed on a highway truck and taken to the scene. Here, the fork lift truck enters the railway car and speedily transfers the ingots to the highway truck for a trip to the company's storage yard. During busy periods, one truck is at siding and one at yard.

Previously, ingots were stacked individually to a maximum height of 7 ft. Now, loads are palletized into units of 100 ingots, strapped into bundles weighing 3000 lb and stacked to a height of 20 ft. Palletization of loads, made possible by the company's new "mass handling" equipment, and the lift truck's high-stacking ability, have increased storage capacity 300 pct.

don't overlook this P&A ESTABLISHED 1869 diamond... it stands for
QUALITY
BRASS
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NICKEL SILVER
Sheet, Strip, Mill Coils or Cut to Length
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Thomaston, Conn.

Another of the Reasons Behind Brad Foote Quality—
TOOTH SPACING

• 99% of gear drawings do not specify tooth spacing. For most applications, industry generally believes that competent gear manufacturers, working by standard AGMA practices, will produce gears within the limitations required for easy assembly and good load transmission.

• Occasionally, however, on very precise jobs you may find it necessary to specify extreme accuracy of tooth spacing and nonadjacent tooth spacing. Applications such as radar mounts, timing mechanisms, indexing mechanisms—all may require closer tooth spacing tolerances than are obtainable with average equipment in the hands of regular gear manufacturers.

• BRAD FOOTE welcomes precision jobs like these. We can add to highly specialized equipment specific experience in meeting this, as well as many other demanding requirements for special gear production.

• Prove to yourselves the savings that BRAD FOOTE quality can mean. Let us quote on the gear requirements for your next program.

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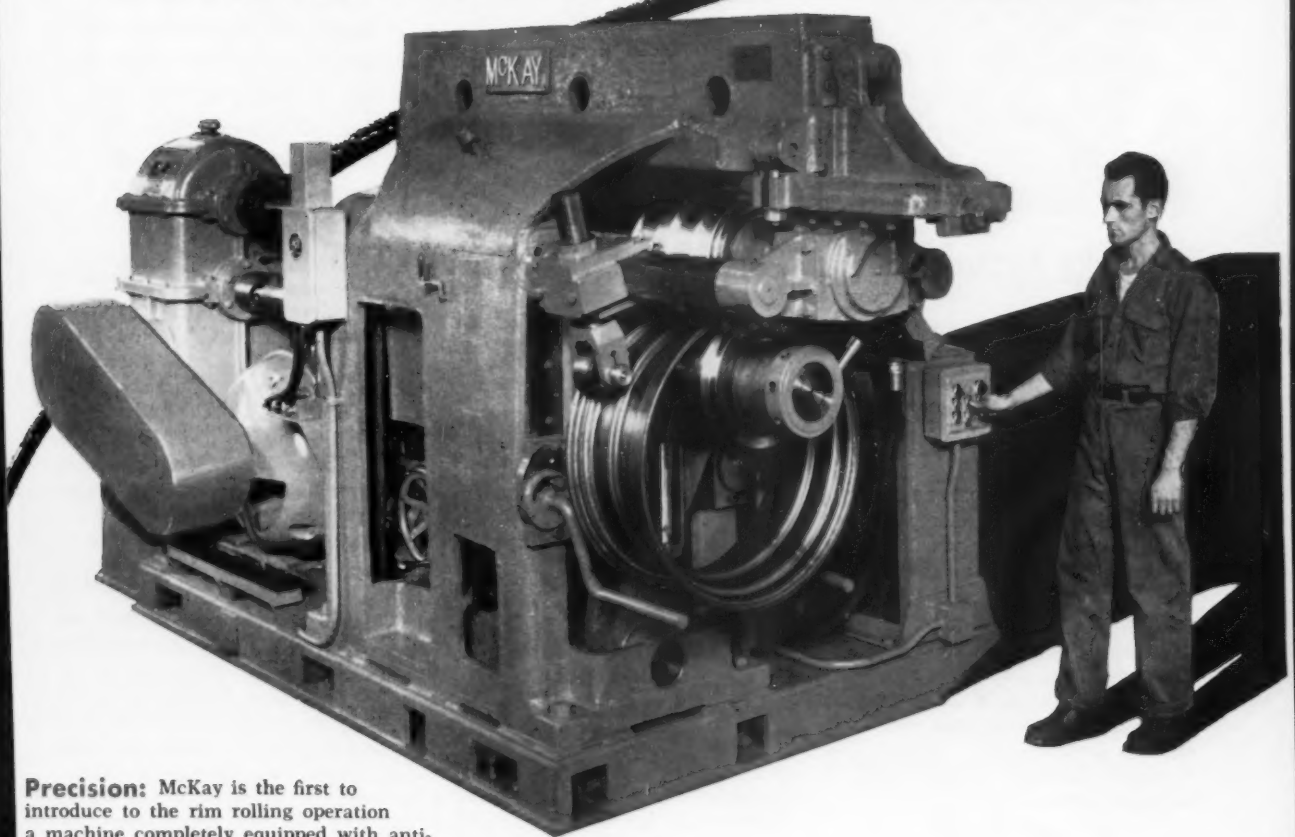
4 REASONS Why Wheel Manufacturers Specify

McKAY RIM ROLLERS



Precision: McKay is the first to introduce to the rim rolling operation a machine completely equipped with anti-friction bearings permitting more load at the work rolls and practically eliminating maintenance. Precision setup of work roll shafts is accomplished either manually or by motor-operated screw adjustment of toggles, permitting the exceptional accuracy needed for the production of rims for tubeless tires.

Ruggedness: A one-piece, cast steel housing absorbs all work loads. A 2-Hi, oil-tight gear case drives both work roll shafts through husky universal spindles providing quiet trouble-free operation.

Performance: Accurate, repetitive cycling is assured by solenoid-controlled hydraulic four-way and flow control valves. An electric timer determines the dwell period of the rim rollers under full load at full depth.

Compact Design: All equipment is mounted on a single base, including the hydraulic power unit and valve panel as well as the electrical equipment and controls. Only 70 square feet of floor space required. A simple connection to your power source and you're in business.

ENGINEERS AND DESIGNERS OF
EQUIPMENT FOR THE AUTOMOTIVE,
FABRICATING AND STEEL INDUSTRIES

McK

The McKAY MACHINE Company
YOUNGSTOWN, OHIO

"I like Airco 78E Electrodes because slag is so easy to remove"

Easy slag removal is just one of the many advantages of Airco 78E electrodes. This deep penetrating, all position electrode produces high quality weld metal which sets up rapidly. It is free from porosity, even when welding in the vertical down position. Especially recommended for welding mild steel where high ductility and tensile strength are essential.

This is but one of many electrodes in Airco's complete line that also includes stainless steel, hard-facing, cast iron, general and special purpose electrodes. Send for the free Airco Electrode Guide which will help you select the right electrode for your specific job. Request catalog 1318-IA.

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New Technical Literature:

Catalogs and Bulletins

Furnaces

"Furnace Equipment for Gas Carburizing," is the title of an 8-page bulletin describing a method of adding carbon to ferrous alloys. The process, its applications, the equipment used, and production advantages are discussed. Material is included on continuous and batch carburizers. *Surface Combustion Corp.*

For free copy circle No. 1 on postcard, p. 129

Grinders

A new bulletin discusses reported advances made in a company line of precision thread grinders. Description is given of these units for grinding extremely accurate external threads. Both machines will handle work up to six inches in diameter. A variety of aircraft engine parts, taps, thread chasers, lead and adjusting screws, worms and other workpieces produced by two machines are pictured in the bulletin. *Ex-Cell-O Corp.*

For free copy circle No. 2 on postcard, p. 129

Process facilities

Equipment and complete plants for the chemical and food processing industries are listed and pictured in a new catalog. It describes a manufacturer's facilities for engineering, construction and procurement services for units or complete plants for the chemical, petroleum, petrochemical and other process industries. *Blaw-Knox Co.*

For free copy circle No. 3 on postcard, p. 129

Switch stands

A new catalog, No. 389, entitled "Bethlehem Switch Stands," has recently been compiled and published. Its contents deal with stands for standard and narrow gauge service and its illustrations tell the story of each of the several models which the company makes. *Bethlehem Steel Co.*

For free copy circle No. 4 on postcard, p. 129

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 129.

Gears

A complete line of nylon, phenolic and helical gears in the fine pitch series (48, 64, 72 & 96 pitch) offered from stock is described in a new catalog. Also covered are additional items such as fine pitch racks, miter gear boxes, pulleys, vernier and dial sets and many other items. *Pic Design Corp.*

For free copy circle No. 5 on postcard, p. 129

Heat resistant cables

A complete 48-page data book on heat-resistant cables has just been released. Typical test results are given for butyl rubber insulation under conditions of high heat and extreme moisture. Also included are dimensional tables for power and control cables for direct burial and duct use. In addition there are 24 pages of valuable engineering information for selecting and applying the proper cable to the specific job. *Hazard Div. of The Okonite Co.*

For free copy circle No. 6 on postcard, p. 129

Steel strapper

A new booklet has been prepared describing a round steel strapping machine. The machine was designed to tension, tie and cut round steel strapping in a single operation, with no seals required. This strapping equipment is described as useful in bundling and palletizing applications. *Gerrard Steel Strapping Div., United States Steel Corp.*

For free copy circle No. 7 on postcard, p. 129

FREE TECHNICAL LITERATURE

Waxes, greases

The chemical structure, specifications, properties, applications and general description of a new group of fluorocarbon oils, waxes and greases for industrial use are described in a new 16-page booklet, "KEL-F Fluorocarbon Oils, Waxes and Greases." Among the applications suggested in this booklet are hydraulic pumps, pump fluids, potting and sealing waxes, damping fluids, heat transfer media, permanent lubricants for instruments and clocks, synthetic lubricant blends, and many others. The booklet also discusses in detail: color and clarity, viscosity, specific gravity, surface tension, flammability, vapor pressure, dielectric properties, acidity, chemical stability, solubility and lubricity, among other qualities of these waxes, oils and greases. *The M. W. Kellogg Co.*

For free copy circle No. 8 on postcard, p. 129

Rivets

A new booklet on tubular rivets is available from a manufacturer of cold formed fasteners and special parts. The booklet describes how to attain quick, economical, permanent fastening with rivets designed for use with any model of tubular rivet setting machine. It shows how various types of tubular rivets are applied. Special sections are devoted to dimensions and specifications. Four tables are included giving recommendations for standard head and shank dimensions, clinching allowances and hole sizes. Also shown are the minimum shank lengths and length increments, in which tubular rivets are normally manufactured. *Townsend Co.*

For free copy circle No. 9 on postcard, p. 129

Alloys

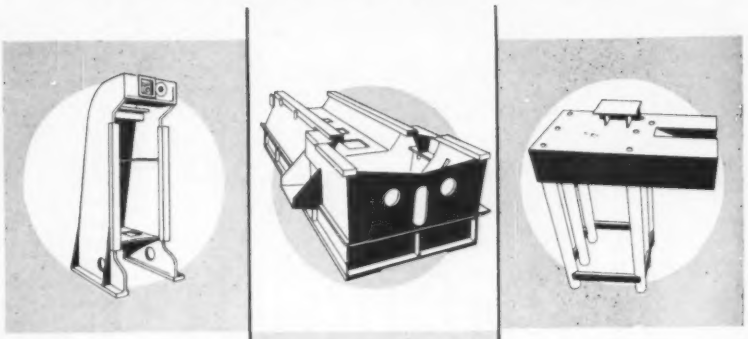
"Alloys for Heat Exchange Problems," is a 28 page illustrated booklet. It presents typical installations of cupro-nickel or nickel-copper alloys in power plants, where they are described as giving longer life, dependable service under ordinary conditions and when plagued by pollution, brackish water or excessive turbulence. *The International Nickel Co.*

For free copy circle No. 10 on postcard, p. 129

Turn Page

ENTERPRISE

WELDMENTS



• Cut costs • Improve appearance • Decrease weight

Weldments can save you money—on pattern costs, reduction of metal tonnage, on shipping and handling. As designed by ENTERPRISE, they usually give you extra savings in time and labor costs, too.

Weldments can make your job look better—by reducing bulk, and by taking full advantage of the newest forming equipment. ENTERPRISE engineers know how to streamline bulky, heavy pieces—and ENTERPRISE is equipped to follow-through with speed and economy.

Lighter weight, accompanied by increased strength, is a typical weldment "bonus." It saves you money—makes expensive jobs reasonable, difficult jobs practical—and gives you an important new sales feature.

Check what ENTERPRISE Weldments can do for *You*.

Write or phone us for information or quotation on any job. Absolutely no obligation.

ESTABLISHED 1878

THE ENTERPRISE COMPANY

Columbiana, Ohio, U. S. A.

DURALOY

A good example of our

WELDING TECHNIQUE

in connection with high alloy casting

This tube support is 21'6" long; 6'7" wide and weighs 8900 pounds. It looks like a single casting. Actually it is made up of three sections welded together in zig-zag strips across the face. It's a Duraloy HH casting destined for an oil refinery cracking still.

Welding is assuming greater and greater importance in the production of high alloy castings. Often it is the only way to produce large tonnage or unusually shaped pieces. During our many years of experience in producing both high alloy static and centrifugal castings, we have developed sound welding techniques for such castings. Carbon steel welding techniques won't serve. It takes special know-how for chrome-iron and chrome-nickel.

You can rest assured that if the chrome-iron or chrome-nickel castings you order from us require any welding, it will be done skillfully.

THE DURALOY COMPANY

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DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE: 332 South Michigan Avenue

FREE TECHNICAL LITERATURE

Dust collectors

A new booklet on the control of dust from coal handling operations has been published. It discusses the use of local exhaust ventilation and cloth-tube-type dust collectors. This method is applicable to such operations as the conveying and preparation of coal for burning in industrial plant or power plant furnaces and boilers; the conveying, screening, and weighing of coke for charging foundry cupolas; and the conveying, screening, crushing, weighing, and batching of coal in chemical processing. Four illustrated case histories are presented. *Wheelabrator Corp.*

For free copy circle No. 11 on postcard, p. 129

Handling

A case history report (Number 31), detailing the handling of malleable iron castings by a New England foundry has just been released. It describes how this company utilizes a battery powered 6000 lb capacity mobile crane equipped with an electro-magnet powered by the truck's battery to handle 200,000 lb of scrap daily. The positioning of the crane within the foundry and the way in which special controls permit charging the skip hoist from the crane cab are both pictured and diagrammed. Additional photos show other duties of the equipment. *Elwell-Parker Electric Co.*

For free copy circle No. 12 on postcard, p. 129

Power unit

Combined unit for welding and for standby power is described in a 4-page folder. The folder covers applications, ease of installation, and operating features. Fully illustrated. *Lincoln Electric Co.*

For free copy circle No. 13 on postcard, p. 129

Chuck jaw blanks

A new folder gives complete specifications for 8 distinct types of chuck jaw blanks reported as designed to fit over 90 pct. of chucks manufactured. The folder illustrates the 6 steps described as eliminated in the average tool room when these chuck jaw blanks are used from stock. *Jergens Tool Specialty Co.*

For free copy circle No. 14 on postcard, p. 129

Customer reports

81% average savings

in Machining Time with . . .

BULLARD

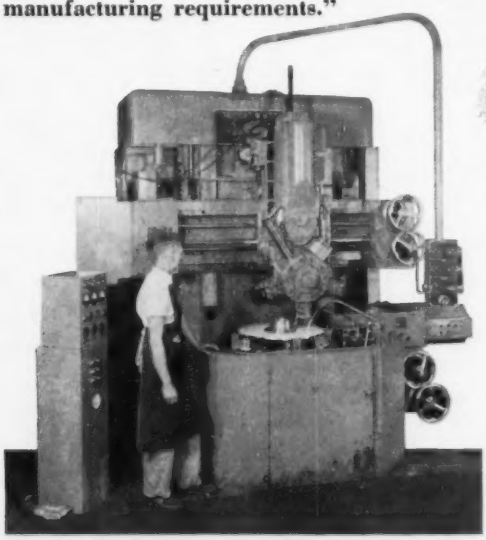
CUT MASTER V.T.L.

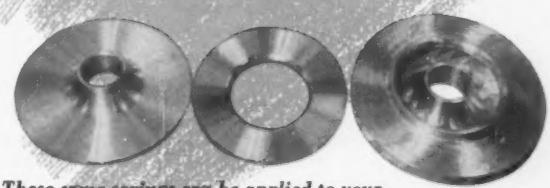
MODEL 75

At the York, Pennsylvania plant of the York Corporation, manufacturers of refrigeration and air conditioning equipment, the new 36″ Cut Master is running 24 hours a day machining hubs and covers for a turbo compressor impeller wheel.

They have calculated an 80% savings in machining time on the hub disc and 82.3% on the cover disc. As a result, the overall savings in all manufacturing operations for the turbo wheel amounts to 57.7%.

"The quality of the machined finish that we get with our new Cut Master, Model 75," says Mr. R. P. Feiser, Industrial Engineer, "is of such high standard that hand finishing is not necessary to meet our exacting manufacturing requirements."





These same savings can be applied to your manufacturing cost problems — for full information call your nearest Bullard Representative or mail coupon for Catalog to

THE BULLARD COMPANY
286 CANFIELD AVE.
BRIDGEPORT 2, CONN.

PLEASE SEND ME A COPY OF THE NEW CUT MASTER, V.T.L., Model 75 CATALOG

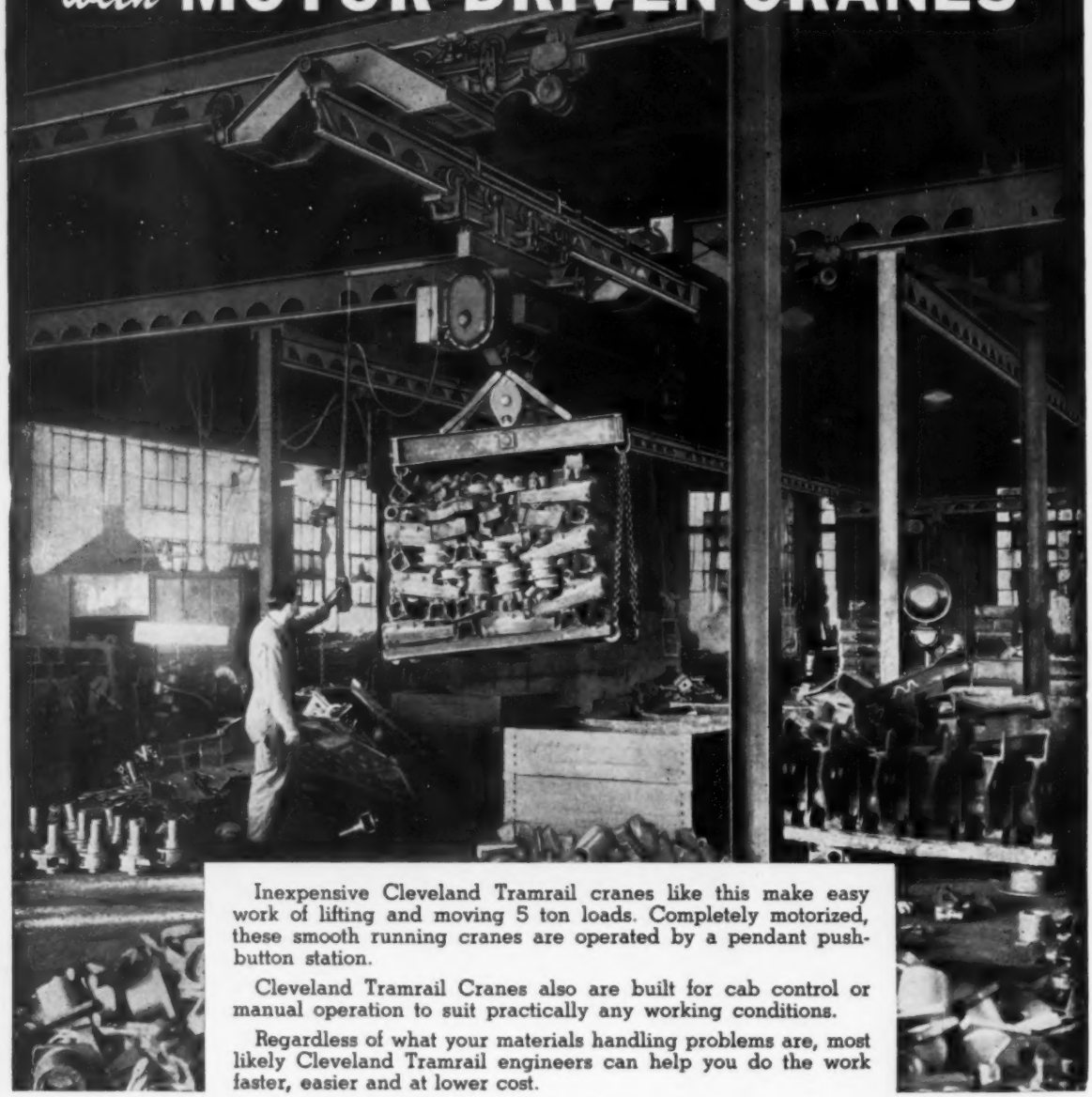
NAME_____

COMPANY_____ POSITION_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

5 TON LOADS *Easily Handled* *with* MOTOR-DRIVEN CRANES



Inexpensive Cleveland Tramrail cranes like this make easy work of lifting and moving 5 ton loads. Completely motorized, these smooth running cranes are operated by a pendant push-button station.

Cleveland Tramrail Cranes also are built for cab control or manual operation to suit practically any working conditions.

Regardless of what your materials handling problems are, most likely Cleveland Tramrail engineers can help you do the work faster, easier and at lower cost.

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OVERHEAD MATERIALS HANDLING EQUIPMENT

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 124

Gages

A new 112-page gage catalog complete with over 40 pages of engineering data, as well as illustrations, instructions for ordering and using gages, and prices has been published. The catalog covers a company line of cylindrical plug gages, taper gages and master setting disks, cylindrical ring gages, adjustable limit gages, thread gages, thread production and checking equipment and pipe thread gages. *Threadwell Tap & Die Co.*

For free copy circle No. 15 on postcard

Acid activator

Literature is available on Actane 70, an acidic fluoride-containing compound used as a replacement for liquid hydrofluoric acid. The material is described as much less hazardous to handle being a crystalline solid. It may be used for the removal of colloidal films in normal acid pickles, it is also extensively used alone or with sulfuric or nitric acids for pickling titanium, etching and cleaning of aluminum, etching of glass, removal of sand from castings and pickling of nickel-chromium alloy steels and many magnesium alloys. *Enthone, Inc.*

For free copy circle No. 16 on postcard

Wire slings

Publication of a new catalog covering a line of gripper woven wire slings is announced. The new book illustrates and describes the gripper sling in detail, contains 4 pages of typical application photographs and gives complete price and specification information. In addition, a new section included in this edition covers gripper slings covered with Neoprene or plastic. *The Cambridge Wire Cloth Co.*

For free copy circle No. 17 on postcard

Air power units

Well illustrated bulletin describes a complete line of controlled air power devices designed to perform basic functions such as work feeding, work holding and tool feeding operations. Units discussed include: an electrically controlled air-operated valve, types of interchangeable control valves, controller of piston rod traverse, power feeds, work holders, arbor presses, work feeders and other work units for drilling and tapping. *The Bellows Co.*

For free copy circle No. 18 on postcard

Heating station

A new bulletin fully describing a remote heating station used in conjunction with control station and motor generator induction heating equipment of either 960, 3000 or 9600 cycles per second and ranging in power output from 30 kw to 300 kw has been issued. Technical data for use of equipment in applications such as tempering, annealing, selective hardening, surface hardening, normalizing, shrink fitting, stress relieving, hot forming, forging, and for brazing and soldering is listed. *Lindberg Eng. Co.*

For free copy circle No. 19 on postcard

Coatings

Series of coatings designed to protect industrial equipment and buildings from corrosion, vapor, moisture and condensation while providing insulation are described in an 8-page folder. A selection table lists recommended types of coatings for various applications, describes their composition, special features and the amount of coverage they will supply. *Insul-Mastic Corp. of America.*

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Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **2/2/56**

Circle numbers for Free Technical Literature or Information on New Equipment:

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Weldments

Bulletin 601 describes and illustrates some of the weldments developed by a manufacturer with facilities to handle the complete development of this equipment. Advantages cited for these weldments are economical cost, better appearance and light weight. *The Enterprise Co.*

For free copy circle No. 21 on postcard

Gear motors

A completely new line of gearmotors and motogears is described in a 28-page publication (Book No. 2447) which includes complete selection data together with features of construction, load classifications, dimension tables, overhung load ratings and mounting assemblies. *Link-Belt Co.*

For free copy circle No. 22 on postcard

Building products

A 16-page booklet covering industrial roofing and siding and installation techniques has been prepared. The publication (A.I.A. File No. 12-C), gives detailed information on weight and coverage, available dimensions and finishes, fastening procedures and architectural specifications for such industrial building products as box-ribbed embossed siding, corrugated roofing and siding and field-fabricated sandwich walls. The booklet also contains a reference list of manufacturers of fasteners, closures and accessories. *Kaiser Aluminum & Chemical Corp.*

For free copy circle No. 23 on postcard

Cylinders

A new 12-page heavy duty air cylinder catalog has been released. Designed to JIC Standards, these cylinders are described as distinguished by completely interchangeable mountings. They are recommended for automation, die work, die automation conveyor applications, foundry, press and welding equipment, machine tools and fixtures. Complete engineering drawings and specifications are included on all five interchangeable mountings (foot, clevis, trunnion, blind end flange and rod end flange). *Petch Mfg. Co.*

For free copy circle No. 24 on postcard

Grinding wheels

Literature is available describing a series of wheels which can be mounted in multiple units by using standard flanges plus mounting sleeve and extended shaft. Discussed is the fact that such multiple wheels increase the area to be worked, yet add little weight, making them ideal for portable use. *Merit Products, Inc.*

For free copy circle No. 25 on postcard

Perforating units

A company line of perforating units is described and illustrated in a new catalog. It covers the firm's Series A units for press and press brake set-ups which punch round or shaped holes in sheets or angles up to ¼ in. thick. Also included are Series B units which punch round and shaped holes in metal up to ⅛ in. thick and have a 5½ in. shut height with 2 19/32 in. die height. Complete press and press brake mounting accessories are also described in the catalog. *Punch Products Corp.*

For free copy circle No. 26 on postcard

Automatic presses

A complete line of high-speed automatic presses is described in a new catalog. The catalog discusses the problems inherent in operating a press at speeds up to 800 strokes per minute and reveals how one manufacturer has designed its line of presses to overcome them. The complete line of presses including special features and attachments is illustrated and described and all dimensions are listed. Special sections have been devoted to feed mechanisms, special purpose presses, and typical examples of the work done on H-P presses. *E. W. Bliss Co.*

For free copy circle No. 27 on postcard

Brazing machines

Production brazing and soldering using a company line of automatic brazing machines is described in Bulletin S-1050. Illustrations together with captions display and discuss the machines as used in a variety of applications. *Selas Corp. of America.*

For free copy circle No. 28 on postcard

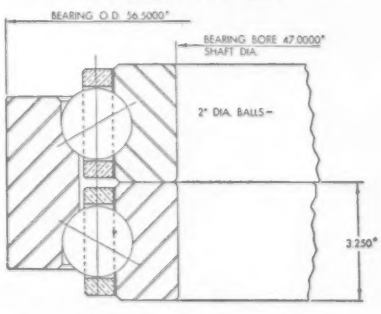
Here are the bearings that "couldn't be built"... *as produced by Kaydon*

THE manufacturer who wanted these bearings had been told they "couldn't be built." Or at least that's what he'd been told *until* he contacted **KAYDON**. What he required was a bearing 56½" in diameter combining high capacity, and exceptional precision for concentricity and face runout that would fit in limited space.

KAYDON designed a double-row angular contact ball bearing (see sketch at right). Actual tests have proved that the bearing fulfills every requirement.

If your designs require bearings of exceptional capacity, close-tolerance precision and/or very thin section — it will pay you to contact **KAYDON** of Muskegon. **KAYDON** has a long-standing reputation for accomplishing the near impossible.

CROSS SECTION — *The bearing that couldn't be built*



Just Out! Get your copy of the new **KAYDON** *Reali-Slim thin bearing catalog No. 54.*

THE KAYDON ENGINEERING CORP.

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KAYDON Types of Standard and Special Bearings:
Spherical Roller • Taper Roller • Ball Radial • Ball Thrust • Roller Radial • Roller Thrust • Bi-Angular Bearings

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ARMSTRONG *Carbide* TOOL HOLDERS

For Higher Speeds, and Heavier Feeds

ARMSTRONG Carbide Tool Holders and ARMIDE (Carbide Tipped) Cutters come in cased sets for tool rooms and maintenance departments, and individually in all sizes for general machine shop and production turning. They permit not only the ready machining of sand-filled castings, the hardest and toughest steels as well as many heretofore "unmachinable" materials, but also make practical much heavier cuts and cutting speeds up to 600 f.p.m. on ordinary work. They also run from 10 to 100 times as long between regrindings.

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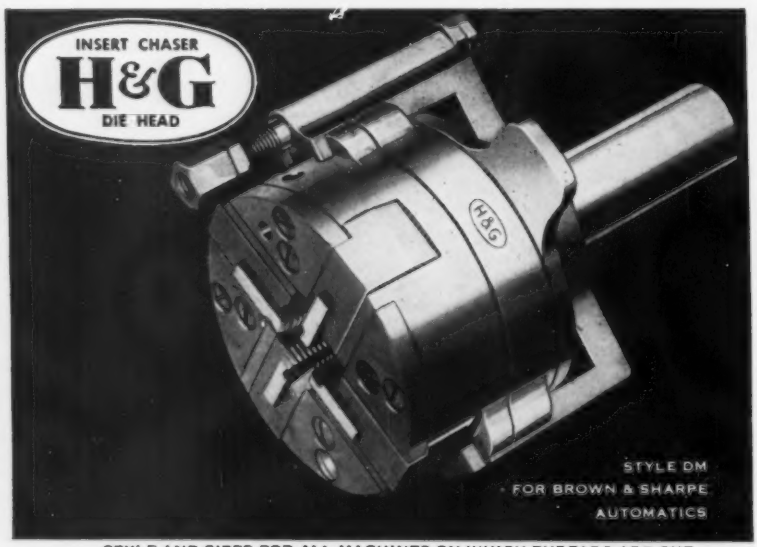


STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

On Brown and Sharpe, and other automatics

INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than $40 you get a dozen sets of ⅜–16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime. FREE: "Selecting the Proper Die Head for the Job".

THE EASTERN MACHINE SCREW CORPORATION 21-41 Barclay St., New Haven, Conn.

FREE TECHNICAL LITERATURE

Filtering

Bulletin 11 describes a number of new devices designed to increase filtering performance and convenience on vertical filters for chemical and water purification. Discussed in the 8-page folder are: Filter leaves that can be lifted from the manifold without unbolting, bottom and top outlet leaves, quick opening cover, jacketed shell, bottom opening filter chamber, and individual leaf outlets. In addition to a full description of the vertical filter line, the literature also details air wash, sluicing and shaking devices. *Industrial Filter & Pump Mfg. Co.*

For free copy circle No. 29 on postcard, p. 129

Grinder

Bulletin 52, an 8-page catalog, describes details of the operation and application of the Disc Roll mill. This new mill is discussed as a roller-type mill based on the "Loesche Mill," originally developed in Germany and well-known throughout Europe. The American counterpart includes improvements such as a "Gyrotor Classifier" and pneumatic roll pressure control. *Hardinge Co., Inc.*

For free copy circle No. 30 on postcard, p. 129

Potentiometer

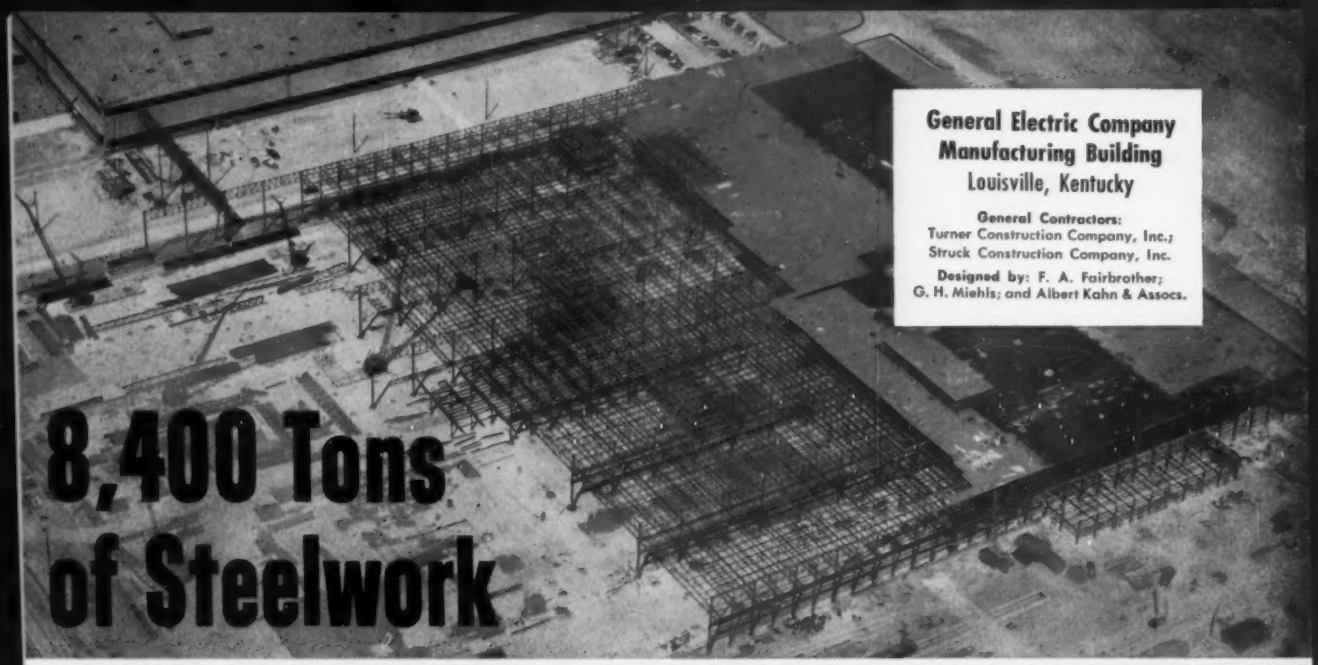
A bulletin describing a new high-speed recording dynamaster potentiometer has just been released. This recorder is described as having a full-scale pen-travel across its 11-in. calibrated chart in only 0.4 second, without overshot on long or short traverses. The 2-color bulletin features a full-size reproduction of a sample chart which shows the characteristics of the new recording potentiometer. *The Bristol Co.*

For free copy circle No. 31 on postcard, p. 129

Heat data

An 8-page bulletin entitled "Heat, Its Generation and Natural Dissipation in Hydraulic Circuits," features useful information regarding: heat transfer area, oil circulation rate, auxiliary pumps, power pumps and pipes and valves, complete with charted test results. *The Oilgear Co.*

For free copy circle No. 32 on postcard, p. 129



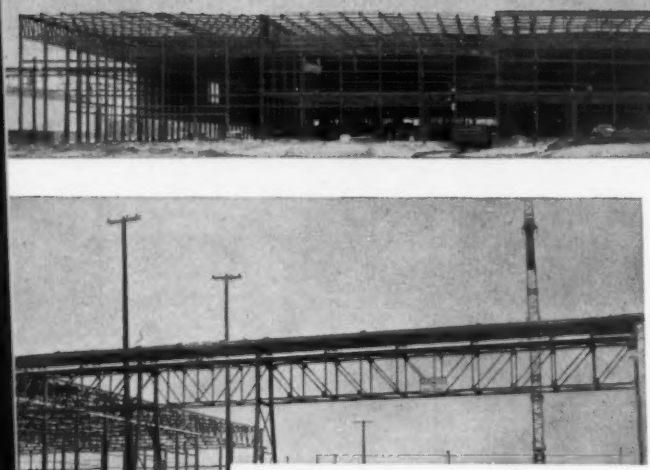
General Electric Company
Manufacturing Building
Louisville, Kentucky

General Contractors:
Turner Construction Company, Inc.;
Struck Construction Company, Inc.

Designed by: F. A. Fairbrother;
G. H. Miehls; and Albert Kahn & Assocs.

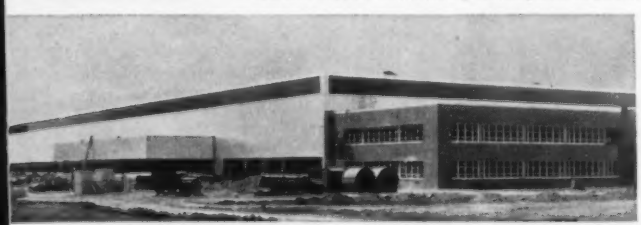
8,400 Tons of Steelwork

erected in 3½ months by AMERICAN BRIDGE



This Pipe Trestle is 190′ long x 8′ wide x 44′ high and connects the new manufacturing building with the existing building as shown in left background of the aerial view above.

Below is a corner view showing the completed structure.



● If you need a new mill, factory, warehouse, or office building in a hurry, American Bridge can fabricate and erect your structural steel requirements with dispatch.

As you see from the aerial view above, this new General Electric Company Plant at Louisville, was no small project! This view shows Manufacturing Building No. 5 which is the largest of five huge buildings being constructed at this project for the manufacture of General Electric Company's Major Household Appliances. Big as this building is, AMERICAN BRIDGE erected the steel framework, all 8,400 tons of it, in only three months and sixteen days!

This new manufacturing building is a special high level industrial structure, 700′ wide x 1,000′ long and with a 43′ clear height to the bottom chord of the main trusses. In addition, the building contains two intermediate mezzanine floors over a major portion of the area. Attached alongside the manufacturing building is a paint and oil storage building 36′ wide by 180′ long. AMERICAN BRIDGE also erected a pipe trestle 8′ wide x 190′ long and 44′ high connecting the new manufacturing building with a building previously constructed.

This new General Electric building and the pipe trestle are good examples of American Bridge fabricating and erecting "know-how." You can depend on AMERICAN BRIDGE to handle any type of steel-frame construction with thoroughness and speed . . . any time . . . anywhere. If you would like to know more about the advantages of having AMERICAN BRIDGE fabricate and erect the steelwork for your next building, just contact our nearest office.

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SILENT HOIST
KRANE KAR

"HAS GIVEN US EXCELLENT SERVICE AT LOW MAINTENANCE COST," says ATLAS FORGINGS COMPANY CICERO, ILL.

"KRANE KAR Unloads freight cars of billets weighing up to 6000 lbs. . . . Stacks them in yard . . . Transports billets to saw shop . . . Loads forgings on trucks for shipment. KRANE KAR is easier to use than our old stationary crane, and saves us time. Now we can make full use of our yard for billet inventory." Ask for Bulletin #79.

Ask about our Lease-a-KRANE KAR-Plan . . . 1 to 3 Year Lease with Option to Purchase.

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Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
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the trend is to THOMAS

Multiple Punches

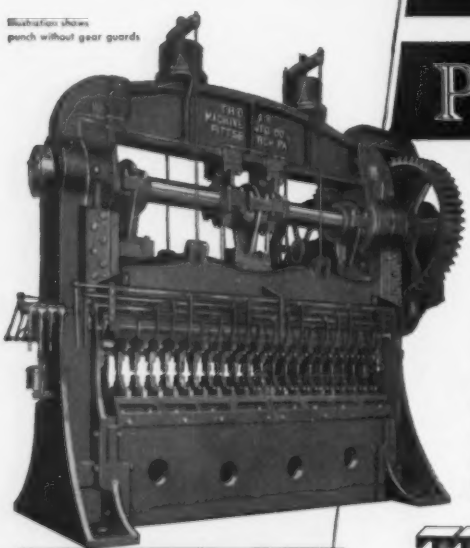

Illustration shows punch without gear guards

● This 1000 ton capacity Multiple Punch was recently shipped by Thomas to a leading railroad car shop, and installed with a Thomas Automatic Spacing Table. ● This combination handles complete punching of four center sill Z sections, two beams or channels, four angles or plates up to 12 ft. wide . . . all automatically without layout on the work.

Other multiples available in various widths and tonnages, with or without Spacing Tables.

53 Write for Bulletin 306

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

Shears • Presses • Spacing Tables • Benders

FREE TECHNICAL LITERATURE

Tapes

A new 4-page brochure, "Horsepower vs. Stick," which provides numerous application suggestions for double-faced tapes, is now available. The 4-color brochure describes the versatility of double-faced tapes in business, industry and the home by adhering metal to rubber, rubber to cloth, cloth to wood and other combinations. Some of the suggested applications are: affixing thin sheet metal to lathe face plates, mounting samples on catalog sheets and holding work on tracing machines. *Permacel Tape Corp.*

For free copy circle No. 33 on postcard, p. 129

Rectifiers

A new 2-color, 4-page bulletin describing and illustrating germanium rectifiers is offered. The germanium rectifier is described as the latest addition to the firm's line of power equipment for electroplating, anodizing and related processing. Thin folder explains the advantages of the germanium rectifier and its features, efficiency, voltage regulation, controls, cooling and electrical protection. *Hanson-Van Winkle-Munning Co.*

For free copy circle No. 34 on postcard, p. 129

Carbide tools

A new 36-page illustrated booklet on carbide tools has just been issued which presents a company's line of carbide tipped and solid carbide drills, reamers, end mills and counterbores. *The Cleveland Twist Drill Co.*

For free copy circle No. 35 on postcard, p. 129

Wire rope fittings

A complete line of fittings for wire rope and chain is shown in a new 28-page catalog. Illustrated with product pictures, the catalog includes engineering data and charts for each of the many types of fittings manufactured by one company. Complete information is included on dimensions and safety factors for links, rings, shackles, swivels, hooks, turnbuckles, thimbles, clips, sockets, ring bolts, eyes and load binders. *American Hoist & Derrick Co.*

For free copy circle No. 36 on postcard, p. 129

Another Example of

VICKERS®

HYDRAULICS

in Automation

Ex-Cell-O Precision Cylinder Boring Machines shown below are finish-boring V-8 engine blocks. Like so many other high-production machines, these make generous use of hydraulics.

In addition to the advantages inherent in hydraulic control, Vickers Hydraulics gives you the benefits of a nation-wide company-operated field engineering and service organization to assure correct application and operation with least maintenance. Vickers has the complete line of hydraulic equipment necessary to take undivided system responsibility . . . to eliminate any risk of incompatibility of hydraulic components.

The Vickers Application Engineer near you will be glad to demonstrate the many benefits you can obtain by using Vickers Hydraulics. Write for a copy of Catalog 5002B.

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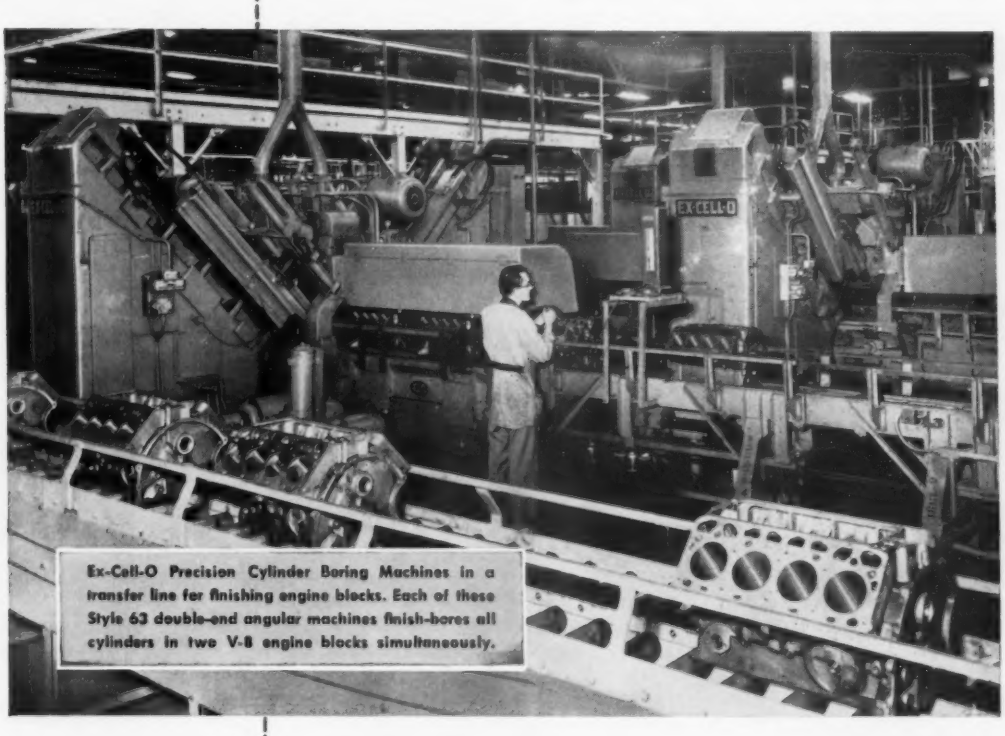
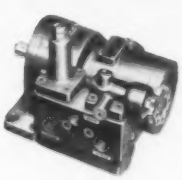
Engineers and Builders of Oil Hydraulic Equipment Since 1921



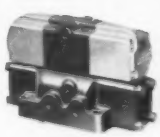
Ex-Cell-O Precision Cylinder Boring Machines in a transfer line for finishing engine blocks. Each of these Style 63 double-end angular machines finish-bores all cylinders in two V-8 engine blocks simultaneously.

Representative VICKERS® Units Used on Ex-Cell-O Precision Cylinder Boring Machines



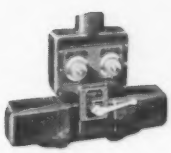
Two-Pressure Pump

Insures lower maintenance cost and saves horsepower and heat in two-pressure hydraulic circuit. Automatically provides high volume at low pressure and low volume at high pressure.



Solenoid Controlled Pilot Operated 4-Way Valve

Compact and versatile "sandwich" construction. Gasket mounting simplifies installation and overhaul . . . also minimizes piping.



Traverse and Feed Cycle Control Panel

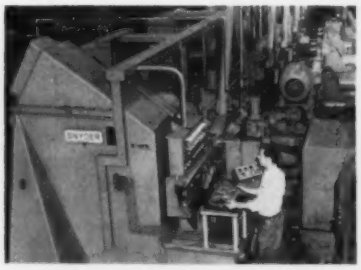
Maintains smooth and constant preset feed rate regardless of fluctuations in cutting tool resistance or hydraulic pressure.

7350

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 129 or 130

Transfer unit mills, drills and taps without turnover



Including a vertical angular rail arrangement to avoid turnover operations, a segmented transfer machine utilizes horizontal way units in the complete milling, drilling and tapping of a cast iron automotive engine intake manifold. The 7-segment, 20-station, 54-ft long machine produces 68 manifolds per hr at 80 pct efficiency. Design features include the use of individual bases, power units and control panels for each segment and a master control panel. *Snyder Tool & Eng. Co.*

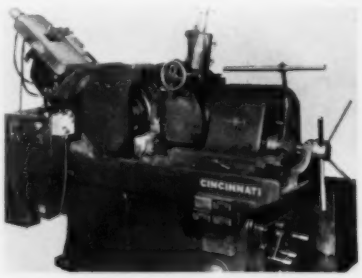
For more data circle No. 37 on postcard, p. 129

Attachment for comparator gages ball bearings

A new attachment for an ultra-precision electronic comparator gages ball bearings of from 1 ml up to 1½ in. diam to an accuracy of ½ millionth of an inch. In addition to gaging ball diameter, the equipment can be used for random sphericity gaging. The attachment is a V-shaped block mounted at a slight angle to permit the ball to roll into a chute after completion of the gaging operation. A manually operated lever moves the ball into the gaging position under the gage head. Contact tip pressure is only 4 oz. *Cleveland Instrument Co.*

For more data circle No. 38 on postcard, p. 129

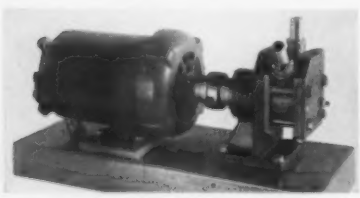
Contour wheel can dress any profile



An automatically operated contour wheel dresser has been developed for use on centerless grinders. It is designed to dress any profile on the grinding wheel into which the diamond can enter, including perpendicular shoulders which normally cannot be dressed automatically. Dressing cycle is controlled by a single moving slide carrying two enlarged cams inside the housing. One cam controls movement of diamond across grinding wheel and one controls movement of diamond in and out of the wheel. *Hoglund Eng. and Mfg. Co., Inc.*

For more data circle No. 39 on postcard, p. 129

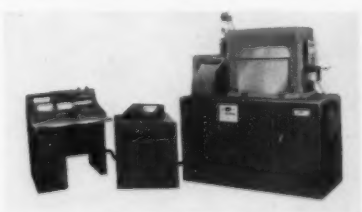
Stainless pumps made for corrosive solutions



A new line of stainless steel rotary pumps has been developed for corrosive solutions, abrasive slurries and fluids which must be maintained free from contamination. The pump units are available in capacity ratings from 1/3 to 20 gpm and can be furnished either directly connected to constant speed or variable speed motor equipment. *Vanton Pump & Equipment Co.*

For more data circle No. 40 on postcard, p. 129

Electronic data processing machine versatile



A new high speed electronic data processing machine automatically sets type and embosses metal plates for identification, writing or addressing, while simultaneously performing four auxiliary operations to prepare plates for industrial systems applications and control procedures. The unit is known as the Databosser. *Dashew Business Machines, Inc.*

For more data circle No. 41 on postcard, p. 129

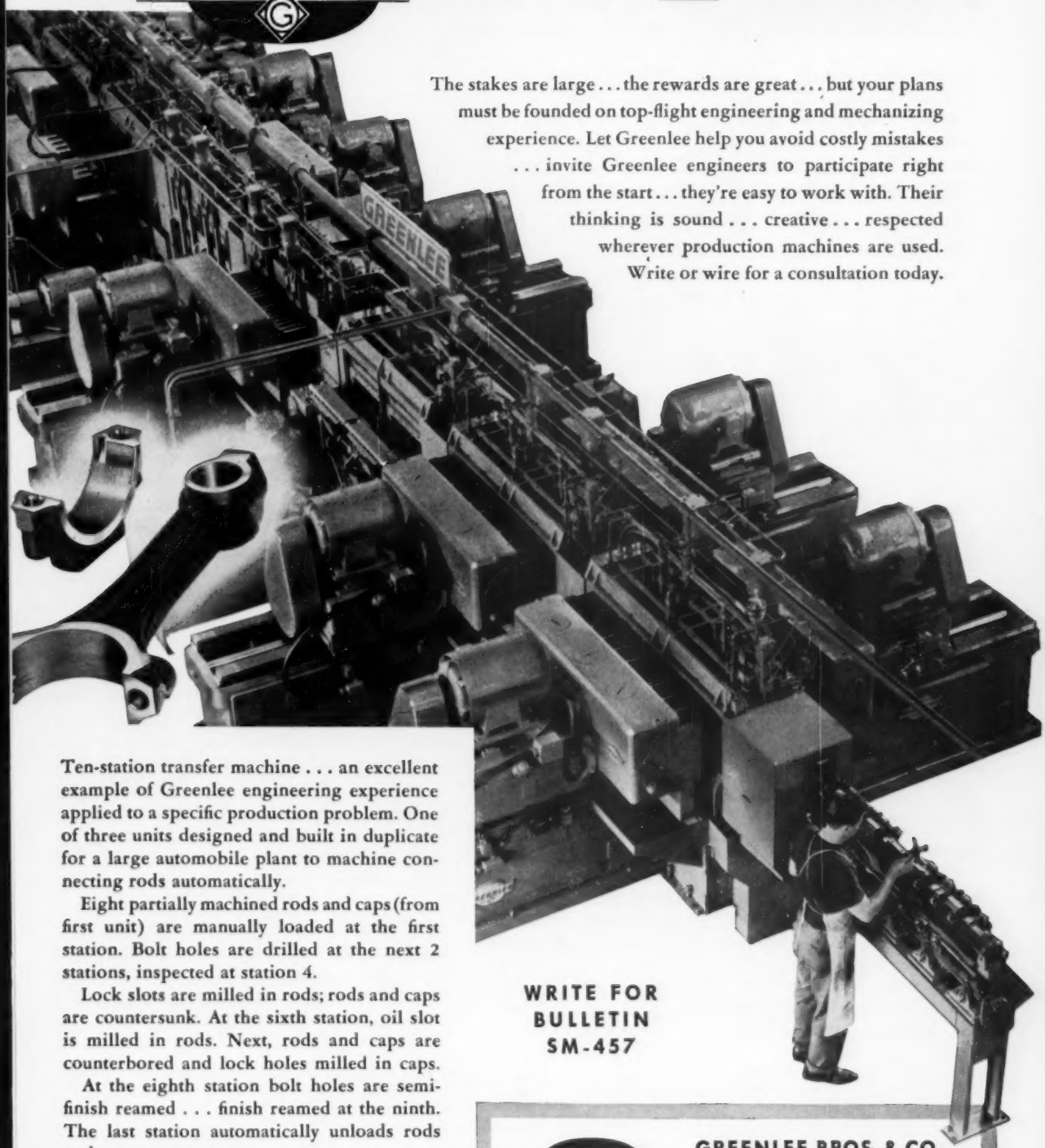
You've Got To Be Right

WHEN PLANNING FOR AUTOMATIC PRODUCTION!

PRODUCTION MACHINERY

Let GREENLEE Help You All The Way

The stakes are large . . . the rewards are great . . . but your plans must be founded on top-flight engineering and mechanizing experience. Let Greenlee help you avoid costly mistakes . . . invite Greenlee engineers to participate right from the start . . . they're easy to work with. Their thinking is sound . . . creative . . . respected wherever production machines are used. Write or wire for a consultation today.



Ten-station transfer machine . . . an excellent example of Greenlee engineering experience applied to a specific production problem. One of three units designed and built in duplicate for a large automobile plant to machine connecting rods automatically.

Eight partially machined rods and caps (from first unit) are manually loaded at the first station. Bolt holes are drilled at the next 2 stations, inspected at station 4.

Lock slots are milled in rods; rods and caps are countersunk. At the sixth station, oil slot is milled in rods. Next, rods and caps are counterbored and lock holes milled in caps.

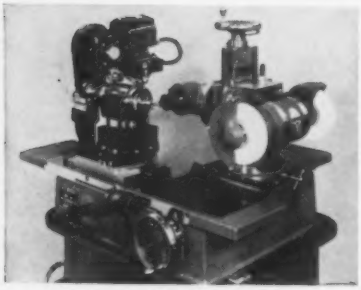
At the eighth station bolt holes are semi-finish reamed . . . finish reamed at the ninth. The last station automatically unloads rods and caps to conveyor.

Processing takes place at the rate of 950 rods and caps per hour. Accuracy is greater . . . production is higher than on any other type of machine previously produced.

WRITE FOR BULLETIN SM-457

PRODUCTION MACHINERY
GREENLEE

GREENLEE BROS. & CO.
1802 Mason Avenue
Rockford, Illinois



Grinding attachment can be positioned at any angle

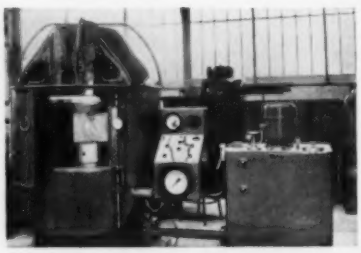
An internal grinding attachment for a form relieving fixture can be positioned at any angle with easily read machined markings and can be raised or lowered by hand wheel. The attachment consists of a precision 65,000 rpm air spindle with filter and pressure regulator and it utilizes regular shop air power. Unit mounts on reverse side of the grinder column so on regular operations it's out of the way. By swinging column counter-clockwise 90°, internal grinding wheel can be brought inside of work. *Royal Oak Tool & Machine Co.*

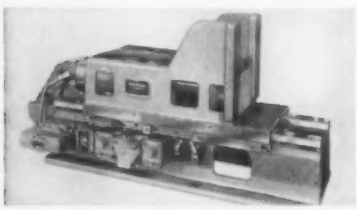
For more data circle No. 42 on postcard, p. 129

Hydraulic circuits used on hobbing presses

Features including hydraulic circuits that permit rapid closing, automatic change-over from high to low speed at the lightest contact between the hob and a die and fine adjustment with the low hobbing speeds, are provided on an improved line of hydraulic hobbing presses going to 5000 ton. Smallest press in the line is a 100 ton unit supplied with a hand operated 2-stage pressure pump. Other presses include, 250, 500, 1000, 2000, 3200, and 5000 ton capacity units. *Haller, Inc.*

For more data circle No. 43 on postcard, p. 129





Feed unit designed for balanced thrust

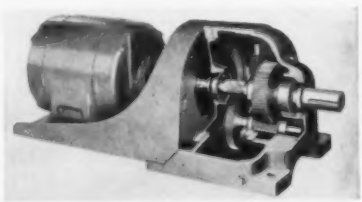
A new hydraulic feed unit features thrust above the ways near the tool load. It provides positive control of rapid traverse, fine feed and depth. Depth will repeat within 0.0005 in. The flange is designed to simplify mounting and aligning of multiple spindle heads and 15 in. stroke assures ample tool change clearance. Power cylinder is accessible for maintenance and controls can be panel mounted. *Hartford Special Machinery Co.*

For more data circle No. 44 on postcard, p. 129

New line of gearmotors and gear drives announced

A new line of gearmotors and gear drives designed to deliver more horsepower per pound has been introduced. The gearmotors range up to 30 hp and the gear drives up to 60 hp. Output speeds range from 280 rpm down to 6 rpm. Compactness is reported as achieved through a unique arrangement of hardened gears. Ratio changes require one gear set. *Link-Belt Co.*

For more data circle No. 45 on postcard, p. 129



Bar feeder handles tube and bar stock automatically

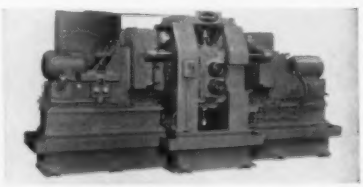
Designed for use with one manufacturer's cutting-off machine, a bar feeder handles random lengths of tubing and bar stock automatically, feeding the entire stock load to the machine without any attention from the operator. Remnants are automatically ejected and the end of each new bar is trimmed and chamfered. Feeders are available to fit every model of the cut-off machine. *Modern Machine Tool Co.*

For more data circle No. 46 on postcard, p. 129

Rough and semifinish bores 420 housings an hr

Using carbide tools and feeding at the rate of 11 in. per min. a tool built to machine compressor housings handled 420 such units per hour. The machine is a double-end, 4-station, trunnion-type machine with 4-spindle, heavy duty boring heads mounted on each of two standard HC-10 ends. Way-type feed units are self-contained. *Michigan Drill Head Co.*

For more data circle No. 47 on postcard, p. 129



Unit finish grinds screw thread 40 ft long

Finish-grinding a screw thread 40 ft long from solid steel stock was one job recently completed by a precision thread grinder. The machine handles long workpieces of this type through a large hollow spindle. *Ex-Cell-O Corporation.*

For more data circle No. 48 on postcard, p. 129

CRUCIBLE TEMPERED
SPRING STEELS

Crucible hardened and tempered spring steels give you the best combination of maximum toughness, resilience and resistance to fatigue.

You get exceptional *uniformity*, too. For once a standard for *your* application has been set, hardness tests, and bend tests for toughness, insure *exact duplication of production lots.*

Crucible hardened and tempered spring steels are promptly available in a full range of sizes, tempers and finishes — in coils or cut to your particular length requirements. And experienced Crucible metallurgists can help you make the best choice for your job. For information on cold-rolled tempered and specialty steels, get your free copy of Crucible's 32-page booklet. For your copy, mail the coupon to: *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

MP-3

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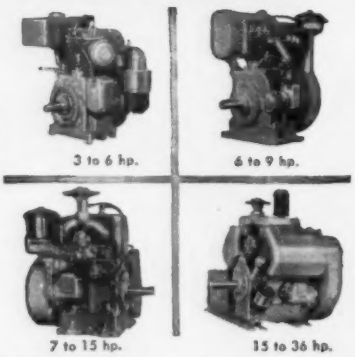
"WISCONSIN ENGINES"

offer the solution to your

POWER PROBLEM



Next to the basic machine itself, one of your major problems is to select and specify a power component that matches both the equipment and the work it is to do . . . *most advantageously*. Wisconsin Heavy-Duty Air-Cooled Engines merit your critical and serious consideration because:

• Every Wisconsin Engine is of HEAVY-DUTY design and construction in all details . . . with the inbuilt stamina to *take it* under all operating conditions, in any climate, at all temperatures from sub-zero to 140° F.

• The Wisconsin line provides the most complete power selectivity to fit both the machine and the job . . . 12 different models in 4-cycle single cylinder, 2- and 4-cylinder types in a power range from 3 to 36 hp.

Wisconsin Engineers will be glad to co-operate with you in adapting Wisconsin Air-Cooled Engines to your original equipment *most advantageously*. Tell us about your problem. "Spec" bulletins available on all Wisconsin Engines.

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World's Largest Builders of Heavy-Duty Air-Cooled Engines

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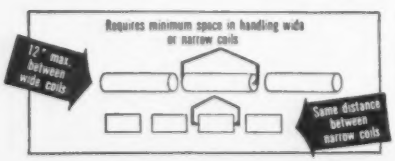
C-F LIFTER

ADVANTAGES

- 1 Lifter handles wide range of coil sizes
- Requires minimum of only 10" to 12" between piles —saves storage room
- 1 man operation — eliminates hookers
- Positive grip on coil — no damage to material

• C-F Coil Lifters are saving time and labor in many plants and warehouses because they can pick up, carry and set down a coil of steel faster and safer than any other method. Infinite jaw openings permit handling a very wide range of coil widths . . . carrying legs open fast, stay open until operator closes them on coil. Narrow legs require minimum space between piles – a space saving advantage. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for illustrated Bulletin.



CULLEN-FRIESTEDT CO.

1303 South Kilbourn Avenue • Chicago 23, Illinois

Angle vise

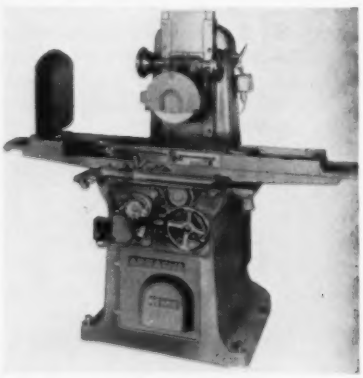
Without use of clamps, wedges or other methods, a new angle vise with a swivel base is reported to provide quick, accurate setups at any angle. Designed for production work, tool work, and bench work where fast angle setups are necessary, the unit has a 3 in. jaw

width, 3 in. jaw opening and 1¾ in. jaw depth. It can be used with or without the 360° graduated swivel base and can be set at any angle from 0° to 90° in a vertical plane. *Chicago Tool and Eng. Co.*

For more data circle No. 49 on postcard, p. 129

Surface grinder

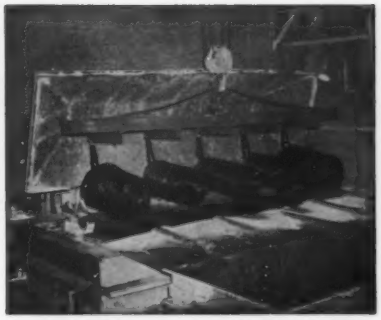
Direct spindle drive (completely removable) is incorporated into a new precision surface grinder. The unit, with a built-in direct two-horsepower spindle motor, has an easily-serviced one-piece construc-



tion and rigid, one-piece bed with heavy ribs and reinforced openings. Other features include a deep, box-like saddle and a well ribbed table. *Abrasive Machine Tool Co.*

For more data circle No. 50 on postcard, p. 129

TITANIUM STRIP is descaled continuously on time cycles as low as 30 seconds, with excellent results.



10-MINUTE IMMERSION loosens scale on 5 tons of stainless wire. A water quench, 3-minute acid dip, and final water rinse produce a clean, bright surface with no pitting or etching.

Use this fast, safe Hooker Process for descaling steel and titanium

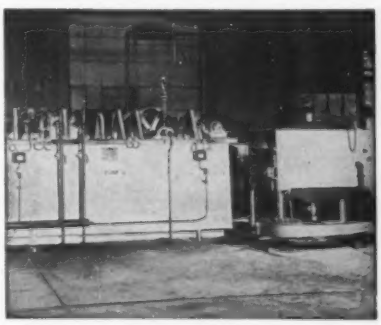
Descale alloy steels and titanium in any form—rapidly, safely—using the Hooker Process with Virgo® Descaling Salt.

A bath of molten Virgo Descaling Salt quickly converts scale, rust, and other surface impurities to an acid-soluble coating. A quench, acid dip, and final spraying then remove this coating in from one-tenth to one-hundredth the usual pickling time, with no measurable effect on the base metal.

You can easily set up the Hooker Process for batch or continuous operation on any form of work including strip, sheets, bars, wire, tubes, plate, castings, forgings, and fabricated parts. You can usually process work as fast as your handling methods allow, with a minimum of supervision. Operation is safe for personnel, and there is little or no spent-acid disposal problem.

You can profit by the experience of more than 50 companies now using the Hooker Process successfully to speed up descaling of alloy steels and titanium in practically every form.

You'll get quick service on any descaling problem, by writing or phoning us. Complete test and engineering facilities are at your disposal, without obligation.



LIGHT-GAUGE ALLOY STRIP is descaled at 20-35 ft. per min. in this Virgo bath, after annealing.

Send for these bulletins—Get the whole story on Virgo Descaling Salt for alloy steels and titanium . . . how the Hooker Process works, its advantages, how to set up a Virgo descaling line, and the services you enjoy as a user. No obligation. Write us today.

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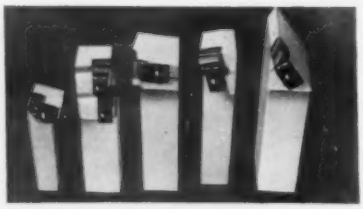
Hexagon bars

A line of large hexagons in the C-1018 grade in sizes ranging from 3 in. to 4 in. is available. Supplied in diameters of 3¼, 3½, 3¾, and 4 in., they are suggested for the production of large nuts, bolts and other parts requiring this shape. Their chemical breakdown is as follows: carbon 0.15/.20 pct., manganese 0.60/.90 pct., phosphorus 0.04 max. and sulphur 0.05 max. *La Salle Steel Co.*

For more data circle No. 51 on postcard, p. 129

Carbide inserts

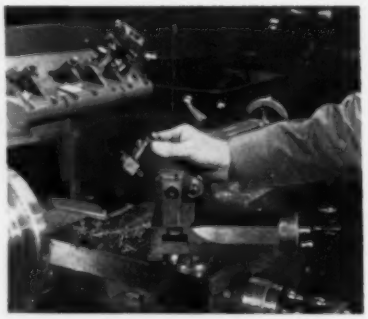
A line of basic holders and inserts has been greatly expanded. One important feature now pointed out is the availability of tips in four grades. There are two ranges, general purpose and heavy duty, and each range has three thicknesses for any application. The holders can use any of the three tip thicknesses through standard seats. *Valenite Metals Corp.*



For more data circle No. 52 on postcard, p. 129

Tool attachment

A new attachment permits cutting tool changes to be accomplished for different machining operations in a brief time on a company line of lathes. Its tool holders position themselves automatically when slipped onto a locating pin and swung downward into a special slot in the precision tool block mounted directly on the compound rest of the lathe. No alignment or clamping of the tools into position is required. A rack holds a complete set of tools and attachments to the rear of the lathe. *Monarch Machine Tool Co.*



For more data circle No. 53 on postcard, p. 129

Induction heaters

A new line of electronic-type induction heaters features a total of 16 models in 4 output ratings for brazing, soldering, surface hardening and annealing. The induction heaters in the line have been rated at 7½ kw, 15 kw, 25 kw and 40 kw output. Each model is provided with combinations of thyratron power control, built-in output transformer or tapped-tank coil for flexibility to a variety of loads and applications. Additional features include dustproof cabinets and separate aluminum enclosures for oscillator units. *General Electric.*

For more data circle No. 54 on postcard, p. 129

"Doc, dermatitis control is simple as 1-2-3-4-5."

An exaggeration?

Not at all. Occupational skin irritation can be prevented. Simply. At surprisingly little cost.

— with the WEST Dermatitis Prevention and Control Program that:

1—insures personal cleanliness
2—protects exposed skin areas
3—prevents clothing contamination
4—guards against special hazards
5—provides continuous consultation.

Workers free of skin irritation can save you hundreds, perhaps thousands, of dollars each year — by eliminating the cost of:

—medical treatment
—enforced idleness
—absenteeism
—sacrificed quality
—lowered morale
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The WEST Program for controlling skin irritations is based on individual shop requirements and an in-your-shop survey, made without obligation. Let a WEST representative plan the details.

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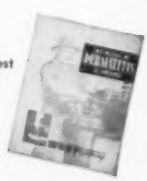

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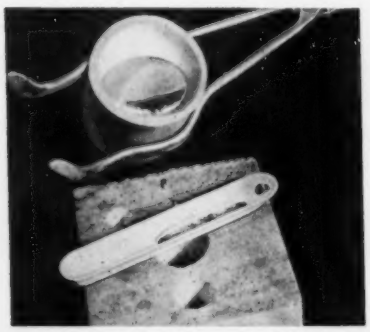
Laboratory crucible

Borolite (zirconium boride 101) is the base material in a new crucible designed to provide high-temperature and corrosion-resistant properties. Recommended for work with molten materials such as aluminum, brasses, bronzes, copper,

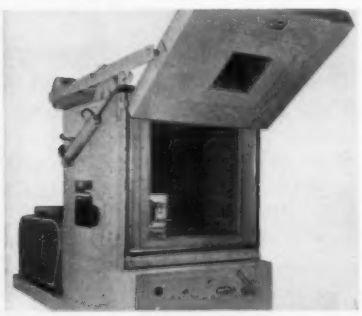


cryolite, fluorides, iron oxide slags, jet engine alloys, lead, magnesium, steel, tin and zinc, the unit has a melting point of 3900°F. It is available in a 50 ml size (3 in. diam, 1½ in. height) and a 100 ml diam (3 in. diam., 3 in. height). *Fisher Scientific Co.*

For more data circle No. 55 on postcard, p. 129

Test chamber

Engineers developed an overhead type of door for a test chamber installed where there was insufficient room to swing a conventional door open. A special feature of construction is that the air cylinder which raises and lowers the door is



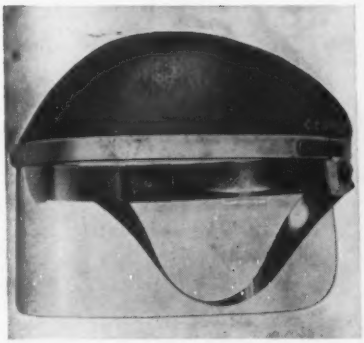
counterbalanced, so that in case of air failure the door will not open or close from any position. Except for the special door, the unit is a standard model cabinet for altitude-temperature-humidity testing. *American Research Corp.*

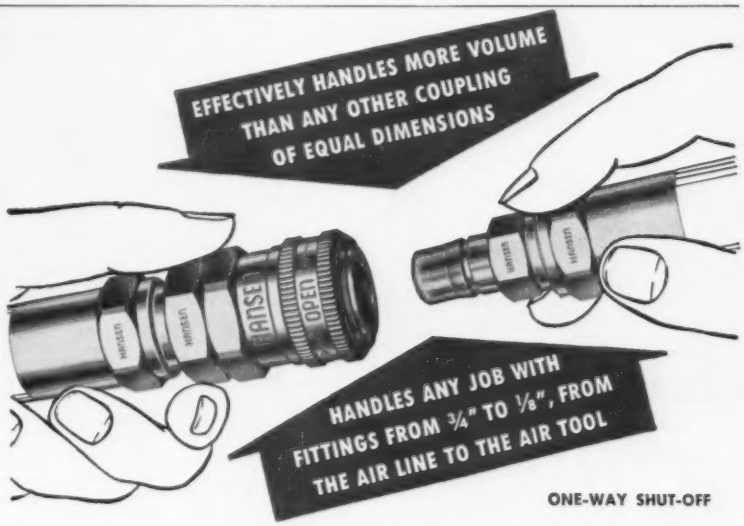
For more data circle No. 56 on postcard, p. 129

Face shield

A new all-purpose face shield for protection in general shop work comes in three window lengths of 4 in., 6 in. and 8 in. measured from top to bottom. Windows mount inside an aluminum channel in a tight assembly which is impervious to the entrance of dirt or liquid. Headband of vinyl plastic is easily adjustable and long-wearing. *Chicago Eye Shield Co.*

For more data circle No. 57 on postcard, p. 129

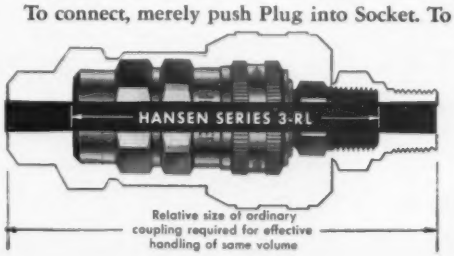



EFFECTIVELY HANDLES MORE VOLUME THAN ANY OTHER COUPLING OF EQUAL DIMENSIONS
HANDLES ANY JOB WITH FITTINGS FROM ¾" TO ⅛", FROM THE AIR LINE TO THE AIR TOOL
ONE-WAY SHUT-OFF

HANSEN Series 3-RL
RING-LOCK COUPLING

Smaller—lighter—compactly designed, the Hansen Series 3-RL Coupling *effectively* handles far more volume than any coupling of equal dimensions. On any job requiring ¾" to ⅛" connections—from the air line to the air tool—this single size Hansen Ring-Lock Coupling—with completely interchangeable Sockets and Plugs—does it all—makes it easy to keep stock of parts in balance—holds inventories to a minimum.

To connect, merely push Plug into Socket. To disconnect just turn the sleeve. Locking ring provides positive lock and assures tight fit. Sockets with aluminum bodies are available for use with small hand-operated air tools.



Write for Descriptive Literature

SINCE 1915 — QUICK CONNECTIVE FLUID LINE COUPLINGS

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

METAL STAMPING FACILITIES
by Lansing
at your Service for...
TRANSPORTATION EQUIPMENT
HOUSEHOLD APPLIANCES
ELECTRICAL EQUIPMENT
INDUSTRIAL EQUIPMENT
FARM IMPLEMENTS
Lansing Stamping Co.
ESTABLISHED 1914
LANSING 2 MICHIGAN

Balancing machines

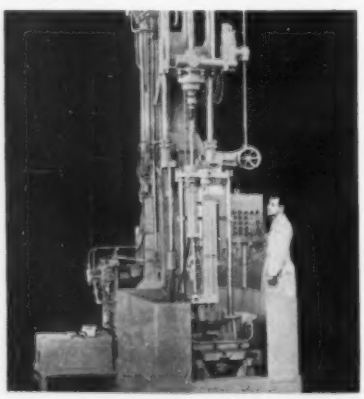
The addition of two vertical static balancing machines to a company line of static and dynamic balancers is announced. With the units, magnitudes of unbalance are positively indicated by a large, easy-read meter which is calibrated directly in terms of unbalance correction procedure selected. Angular positions are accurately pointed

out by a stroboscopic lamp and are readable either as a location to remove weight or as a location to add weight, dependent upon the users correction procedure. One model has weight capacities of 1 to 20 lb and will handle diameters up to 20 in., while another will handle 5 to 75 lb and diameters up to 20 in. also. *Balance Eng. Co.*

For more data circle No. 58 on postcard, p. 129

Microhoner

A heavy duty microhoning machine has a maximum 50 in. hydraulic head stroke and a work diameter capacity of 15 in. Equipped with an 8-speed transmission, variable delivery hydraulic pump



and tank unit and controls and a safety interlock to hold the head in the up position, this machine may be obtained with either remote control manual mechanical feed or automatic hydraulic tool expansion. *Micromatic Hone Corp.*

For more data circle No. 59 on postcard, p. 129

Polisher

An automatic polishing attachment for metallurgical specimens accommodates 6 mounted specimens of 1 in. diam, or 5 of 1¼ in. diam. It is designed to fit a company line of 8 in. low speed polishers. Complete polishing procedure for the

group of specimens requires an average of 20 minutes. The unit can be attached to single bench top polishers or one, two or three unit tables. *Buehler Ltd.*

For more data circle No. 60 on postcard, p. 129

Multiple spindle head

Capable of tapping up to 8 holes in any pattern with taps of different pitch, a new high production universally adjustable multiple spindle tapping head is made to fit any drill press. The unit incorporates an electrically controlled, automatically reversing spring clutch drive through which a single drill press spindle can drive from 2 to 8 taps in automatic or semi-automatic tapping cycles. Only two adjustments — setting lower and upper stop limits to the desired depth are necessary to set up unit. Available in two models. *Commander Mfg. Co.*

For more data circle No. 61 on postcard, p. 129

You can draw
— form THIS...

from THIS...

with simple, inexpensive
die-sets on

FARQUHAR PRODUCTION LINE PRESSES

THE economies of automation and constant-flow set-ups need not be dependent on high cost dies. The versatility of Farquhar Production Line Hydraulic Presses makes it possible to draw and form intricate shapes by progressive operations using simple, low cost die-sets.

The economy of these presses is not confined to reduction of tooling cost. For instance, the four column presses illustrated here provide areas for loading and unloading from four directions providing maximum flexibility in setting up a constant flow of material in a production line operation.

Maintenance costs, too, are minimized by sound engineering and construction. Easy accessibility to all moving parts is an important maintenance feature.

Farquhar engineers are ready to help you select the right units for your purposes from our wide range of presses.

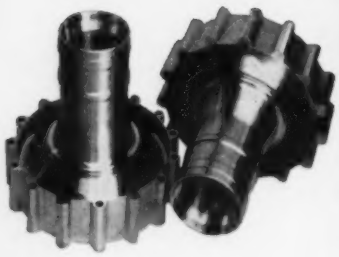
Send for this fact-full catalog... it describes the basic types of Farquhar Production Presses. Write: A. B. Farquhar Division, The Oliver Corporation, Press Dept., York 22, Pennsylvania.

OLIVER

FARQUHAR

PRODUCTION PRESSES

DRAWING • FORMING • FORGING • STRAIGHTENING • BENDING • FORCING • ASSEMBLING • EXTRUDING • AND OTHER OPERATIONS



There's a first-cost advantage when your Bor-Dril operation can be done on a Standard Ex-Cell-O Machine. This Style 112-D Precision Boring Machine is Bor-Drilling 14 holes from the solid on the part shown above.

Short Cut in Long Hole Drilling

EX-CELL-O'S BOR-DRIL METHOD

Bor-Dril is a new cost-reducing way to drive gun drills. It makes possible high production with accuracy on long holes from solid, maintaining finish size. Also it finish-machines cored holes in castings in one operation. Since its recent introduction by Ex-Cell-O, Bor-Dril is saving money on many newly developed applications. Range of hole sizes is large, and the process takes widely varied sizes and shapes of parts made of steel, cast-iron, bronze, aluminum, magnesium and titanium. For more information on Bor-Dril, or for a quotation on a machine equipped for this work, call in your local Ex-Cell-O Representative or contact Ex-Cell-O in Detroit.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSINIGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

56-6

The Iron Age SUMMARY . . .

Reported "easing" in steel demand is just a myth . . . Orders on the books and business in the offing are grounds for optimism . . . Warehouse sales good indicator.

Lots Of Zip . . . There's still plenty of zip in the steel market. The optimism of steel leaders is not just whistling in the dark. It's backed up by orders on the books and more business in the offing.

The automotive cutbacks have caused scarcely a ripple in the pattern of incoming business. Other consumers are taking up the slack. Automotive parts suppliers, for instance, are happy to get the leftovers.

Further evidence is the continuing fast pace of warehouse sales. Steel warehouses have gone through December and January at October sales levels, which means they've done as much business in their normal slump period as they usually do in their peak months.

The piecemeal advance in steel prices through adjustments in extras and, in some cases, base prices, is based on (1) confidence that business will hold up; and (2) the need to bring the price structure into line with production costs.

No Letup In Sight . . . Steel consumers are not likely to let up on the pressure for delivery so long as (1) their inventories are low in relation to production; (2) the steel labor outlook remains uncertain; and (3) the probability that steel prices will move up in one way or another both before and after the labor settlement.

Tinplate consumers, for one, are taking no chances. They'll continue to build inventory until labor negotiations are out of the way. They were burned once—in 1952—and don't intend to get caught short again.

Some other signs of continued strength include (1) new business is running ahead of new capacity; (2) backlogs are growing in plates, structurals, and most grades of pipe; (3) some small and medium size fabricating shops are loaded to the hilt with business and would like to step up production—if they can get the steel; and (4) when most steel firms opened second quarter order books they found enough business being offered to fill the third quarter.

The Scrap Break . . . The break in steel scrap prices was a reaction to the record-breaking levels of recent weeks, plus the influence of high blast furnace production and the fear by brokers and dealers of possible controls. A second reaction may develop later in first or second quarter.

Steel operations this week scheduled at 99 pct of capacity, off slightly from last week's record-breaking 100.5 pct, 2,474,310 tons.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,427	2,427	2,340	2,075
Ingot Index				
(1947-1949=100)	152.2	152.2	145.5	129.0
Operating Rates				
Chicago	99.0	100.5*	99.0	87.0
Pittsburgh	101.0	101.0	100.0	82.0
Philadelphia	101.0	100.0	100.0	84.0
Valley	96.0	98.0*	92.0	85.0
West	101.0	104.5*	98.0	88.0
Detroit	100.0	106.0	95.0	89.0
Buffalo	105.0	105.0	105.0	100.0
Cleveland	103.0	97.0*	95.0	83.0
Birmingham	96.0	97.0	92.0	79.0
S. Ohio River	96.0	95.0*	90.0	95.5
Wheeling	103.0	104.0*	100.0	98.0
St. Louis	106.0	99.0	103.0	89.0
Northeast	85.0	85.0	82.0	50.5
Aggregate	99.5	99.5	97.0	86.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.797
Pig Iron (Gross Ton)	$59.09	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$50.83	$50.83	$53.33	$35.50
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	23.20
Copper, electrolytic	43.00	43.00	43.00	33.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	102.00	104.00	107.75	89.625
Zinc, E. St. Louis	13.50	13.50	13.00	11.50

'Extra' Revisions Make News

U.S. Steel announces price revisions of extras for carbon plate, sheets, strip . . . Auto cutbacks bring little relief to sheet buyers . . . Gov't modifies clad sheet standards.

◆ PRICE REVISIONS of extras for carbon steel plates, heavier gages of hot-rolled carbon steel sheets, and hot-rolled carbon steel strip are announced by U. S. Steel and its general operating divisions.

Although there's no change in the price base for plates, various changes were made in hot-rolled carbon steel plate extras. Charges for thickness and width, previously shown as separate extras, have been combined as size extras.

Revision has been made in the base size which formerly was ½ in. to 1½ in. inclusive in thickness, over 60 in. to 90 in. in width.

The new base size range for which no size extra is charged will be ½ in. to 1 in. exclusive in thickness, over 80 in. to 90 in. inclusive in width.

Certain other plate extras were revised upward. These include such items as specification and chemical requirement extras, quality extras, heat treatment, surface finish, and gas cutting extras.

Over-all effect of the revisions in carbon plate extras is estimated to be an increase of around 5 pct.

Extras for gage, width, and length for hot-rolled sheets reflect increases ranging from 5¢ to 15¢ per lb. Similar extras for hot-rolled strip spell out increases from 5¢ to 35¢ per lb.

The U. S. Air Force, the Bureau of Aeronautics, and the Aircraft Industry are effecting a simultaneous change in the military standard in thickness and gage numbers of all uncoated and metal clad sheet and strip metals.

Air Materiel Command says new standard, to be used in aircraft practice, has simplified system for designating thickness.

Wyckoff Steel Co., Pittsburgh, has instituted new extras for cold-finished alloy steel bars, effective immediately. The company says the move reflects the recent increases in raw material costs.

Crucible Steel Company of America, Pittsburgh, has begun preparations to blow in its No. 2 blast furnace at the company's Midland Works, Midland, Pa.

All of the firm's three blast furnaces, with a total annual capacity of 895,000 tons, will be in operation for the first time since October, 1953, when this furnace was shut down and relined.

SHEETS AND STRIP . . . Some further softening in cold-rolled sheet demand, principally from the auto makers, is noted in **Cleveland.** Other customers, however, are picking up any released tonnages, indicating that the product is still tight in this market. A few fortunate warehouse consumers are finding that occasionally they can get some orders filled now where they couldn't a month ago. Major **Chicago** mills are now "officially" on record as having full order books for both sheet and strip through the first half. Delivery allotments, as expected, are remaining at first quarter levels or slightly below. Automotive demand is showing little letup at the moment. Hot-rolled sheet demand from farm equipment manufacturers isn't quite as insistent as it has been. A few **Pittsburgh** producers have opened second quarter order books for sheet and strip. For some grades, however, mills are limiting orders to a month at a time. While actual orders on cold-rolled sheets won't be substantially higher for consumers, they will receive additional tonnages during second quarter as mills become more current on deliveries. Automakers are taking some pressure off the mills for fast sheet deliveries.

BARS . . . A slight falling off in bar demand by **West Coast** automotive is having little slowing-down effect in general customer purchases. Other industries are grabbing up the stock automakers don't need. Warehouse bar sales are showing some pick-up again in **Chicago.** Generally, warehouse inventories are relatively strong at the moment. Cold-finishers inventories are at a 20 to 30 day level, or slightly below normal, though hot-rolled runs as high as 45 days inventory. Leaded bars have been sold out through first half for some time. Going into second quarter, **Pittsburgh** mills will have some carryovers, particularly in hot-rolled bars. Strong demand for hot-rolled bars is keeping demand on cold-drawn bars high as hot bar stock is not too readily available. Reinforcing bars will be in tight supply through the second quarter.

PLATE . . . Demand for all sizes of plate in **Pittsburgh** continues at a terrific pace. Mills which are accepting some second quarter plate orders are being very cautious. Owing to already heavy carryovers from first quarter, producers are moving slowly in accepting new business. The railroads, shipbuilders, and road construction industry are clamoring for all the plate they can get. Little letup in the heavy consumer demand is expected by **Chicago** producers for the balance of the year.

STRUCTURALS . . . In virtually every market district, current demand for all types of structurals is far outstripping mill deliveries. **West Coast** highway, dam, bridge-building, and office building programs are moving at a fast clip, eating up structurals.

PIPE AND TUBING . . . Output of seamless tube by **Cleveland** mills is still running at capacity with no end in sight. The same also applies to large diameter welded pipe. Any easing of supply in other steel products will not affect seamless since the limiting factor is mill capacity, not basic steel. Seamless tubing and oil country goods producers in **Pittsburgh** are reportedly cutting down on their delivery backlogs. It's expected carryovers will be substantial.

Purchasing Agent's Checklist

COPPER: New process will make ore go further ..... p. 40
STEEL: Warehousemen see sales holding strong ..... p. 44
MACHINE TOOLS: Reserve policy switch stirs Senate probe ... p. 63
STAINLESS: How to get more for your dollar ..... p. 81

Comparison of Prices

(Effective Jan. 31, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Jan. 31 1956	Jan. 24 1956	Jan. 4 1956	Feb. 1 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled Sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.80
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	42.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.797¢

	Jan. 31 1956	Jan. 24 1956	Jan. 4 1956	Feb. 1 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$63.69	$61.19
Foundry, Valley	59.00	59.00	59.00	56.50
Foundry, Southern, Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia	62.77	62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74.76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig Iron	$59.09	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$50.50	$50.50	$53.50	$36.50
No. 1 steel, Phila. area	52.50	52.50	54.50	35.50
No. 1 steel, Chicago	49.50	49.50	51.00	34.50
No. 1 bundles, Detroit	*46.00*	47.50*	45.50	29.00
Low phos., Youngstown	*54.50*	56.50	55.00	36.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	43.50
No. 1 mach'y cast, Philadel'a.	*56.50*	57.50	56.50	43.50
No. 1 mach'y cast, Chicago	*52.50*	54.50	56.50	44.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$50.83	$50.83	$53.33	$35.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$43.00	$43.00	$43.00	$33.00
Copper, Lake, Conn.	43.00	43.00	43.00	33.00
Tin, Straits, New York	*102.00*†	104.00	107.75	89.625
Zinc, East St. Louis	13.50	13.50	13.00	11.50
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	24.40	24.40	24.40	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	33.25	33.25	33.25	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50
† Tentative. ‡ Average. * Revised.				

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	.....	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	60.50	61.00	61.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	.....	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. *Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron Buffalo, *H1*, $68.75; Jackson, *J1*, *G1*, $67.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

←To identify producers, see Key on P. 160→

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	32.25	32.25
Sheets	44.25	44.50	52.25	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	58.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2, J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa. *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R5*; Middletown, O., *A7*; Harrison N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*, Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown; *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J3*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*.

Key Markets Hold Firm

Steelmaking prices remain steady in Pittsburgh, Chicago, Philadelphia . . . Prices drop in Cleveland, Detroit, and New York . . . Composite holds firm at $50.83.

◆ PRICES OF NO. 1 GRADES are holding firm in Pittsburgh, Chicago, and Philadelphia following last week's downturn.

And, there are signs that a leveling off point may have been reached for the present in these centers.

Elsewhere, however, steelmaking prices continued to show signs of weakness.

Cleveland and the Valley dealer grade market dropped $1 on the basis of sales. Broker buying in Cleveland is down in a concerted effort to get material for older orders.

Prices for openhearth steel in New York are off $2 as the result of last week's purchase by a large mill in an adjacent consuming area. And, in Detroit, steelmaking prices were off anywhere from $1 to $2 as bidding on the February auto lists reflected a gradual softening in the market there.

A last-minute purchase by a large consumer last week dropped prices in Pittsburgh and Philadelphia. THE IRON AGE stopped the presses to reflect these changes. But some issues carrying prices reflecting the market prior to this purchase were distributed.

To set the record straight, the correct prices in the issue of Jan. 26 are: Pittburgh, No. 1 heavy melting, $50-$51; No. 2 heavy melting, $45-$46; No. 1 bundles, $50-$51; No. 2 bundles, $42-$43. Philadelphia, No. 1 heavy melting, $52-$53; No. 2 heavy melting, $46-$47; No. 1 bundles, $52-$53; No. 2 bundles, $43-$44; low phos, $58-$59; electric furnace bundles, $55-$56.

New York, No. 1 heavy melting, $47-$48; No. 2 heavy melting, $42-$43; No. 2 bundles, $35.50-$36.50.

Through a misunderstanding, Chicago prices also were incorrect in some copies of the magazine. Correct Chicago prices for issue of Jan. 26 are: No. 1 heavy melting, $47-48; No. 2 heavy melting, $38-$39; No. 1 factory bundles, $51-$52; No. 1 dealer bundles, $48-$49; No. 2 dealer bundles, $38-$39; low phos punchings and plate, $55-$56.

On the basis of the continued firmness in the Pittsburgh, Chicago, and Philadelphia markets, THE IRON AGE steel scrap composite is holding at $50.83.

Pittsburgh . . . No. 2 heavy melting is off $1 following the latest purchase of openhearth scrap by a large independent mill. The tonnage included No. 1 heavy melting at $51, No. 2 heavy melting at $45 and No. 2 bundles at $43. Another independent mill followed with purchases of secondary grades at the same prices. Despite some scattered dealer resistance on prime material, brokers are generally covering orders without any difficulty.

Chicago . . . The Chicago market began to steady after last week's slip, though cast exhibited further weakness and turnings were not moving well. Broker buying offers at $46 for No. 1 heavy melting and $36 for No. 2 dealers' bundles were declined. Shipment of No. 1 factory bundles on a $51 offering price began moving.

Philadelphia . . . On the heels of last week's downturn in steelmaking prices, blast furnace grades are off slightly. Lower prices are also reported for low phos, electric furnace bundles, heavy turnings, railroad steel wheels, and railroad spring steel. The cast market is holding firm to earlier listings with the exception of No. 1 machinery cast, which is off $1.

New York . . . Steelmaking prices are off $2 and turnings down $3 for this area as the result of last week's purchase by a large consumer in an adjacent consuming area. No other new business is reported by press time and the trade is waiting apprehensively for February buying.

Detroit . . . Bidding on the February auto lists reflected a gradual softening in the market here. Prices were off anywhere from $1 to $2. No local or outside buying has been reported yet, but at least two local mills are expected to come into the market later this week.

Cleveland . . . Cleveland and the Valley dealer grade market dropped $1 last week on two sales in the Valley. Valley consumer bought premium grade at $56, normally carrying a $1 premium, and a large fringe area consumer bought electric furnace grade at $55. Broker buying is down in a concerted effort to get material for older higher priced orders. The first local auto list sold for $4.50 under a month ago on a split bid at $51.50-$52.50 in Cleveland, and a second went for $52.

Birmingham . . . Although there was no buying of open hearth scrap in the Birmingham district, an Atlanta mill purchased scrap this week at $2 per ton below quoted prices, and brokers here expect this decrease to show up when the largest buyer in this district again enters the market.

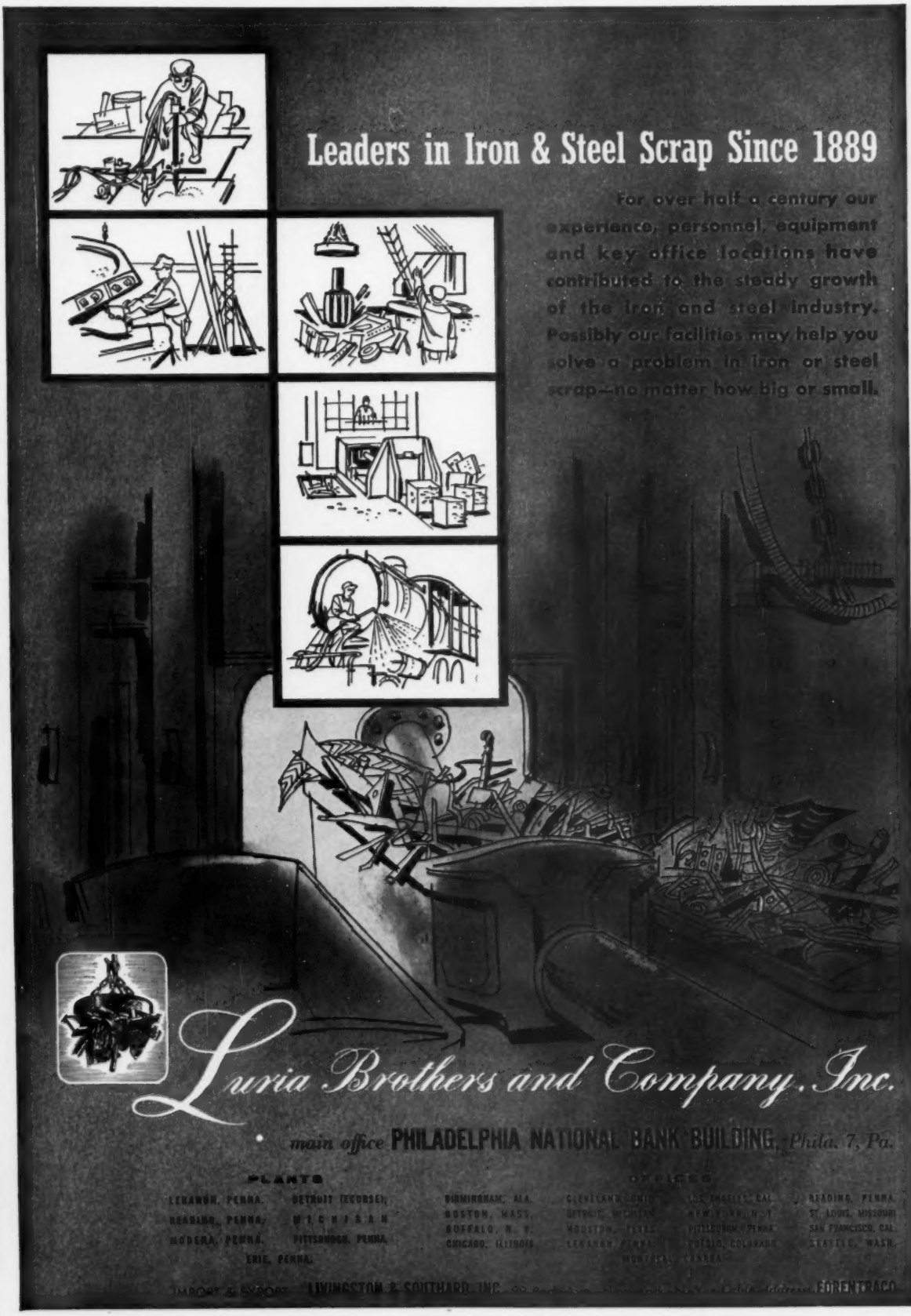
St. Louis . . . The steel operating rate in the St. Louis district jumped seven points to the near record 106.1 pct. While shipments so far are continuing at a steady rate, a blanket of snow which covers the area is expected to cause a slowdown of an estimated 25-30 pct in collection, movement, and processing.

Cincinnati . . . A fringe area mill announced monthly prices unchanged on primary grades and down $1 on secondary grades. Shoveling turnings were dropped $1.50 a ton and cast iron borings were within quoted limits.

Buffalo . . . No new business has been placed in the slightly softened market here. Dealers expect lower prices, $2 to $4 lower per ton.

Boston . . . Steelmaking grades are off $1 to $2 and lower prices are also reflected in other grades. Brokers and dealers say there's some confusion in the market at the moment.

West Coast . . . There's plenty of scrap in Los Angeles, San Francisco, and Seattle. Mills are even getting more than they need.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For over half a century our experience, personnel, equipment and key office locations have contributed to the steady growth of the iron and steel industry. Possibly our facilities may help you solve a problem in iron or steel scrap—no matter how big or small.
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LEBANON, PENNA. DETROIT (RECORSE), MICHIGAN
READING, PENNA. PITTSBURGH, PENNA.
MODENA, PENNA.
ERIE, PENNA.
OFFICES
BIRMINGHAM, ALA. CLEVELAND, OHIO LOS ANGELES, CAL. READING, PENNA.
BOSTON, MASS. DETROIT, MICHIGAN NEW YORK, N. Y. ST. LOUIS, MISSOURI
BUFFALO, N. Y. HOUSTON, TEXAS PITTSBURGH, PENNA. SAN FRANCISCO, CAL.
CHICAGO, ILLINOIS LEBANON, PENNA. PUEBLO, COLORADO SEATTLE, WASH.
MONTREAL, CANADA
IMPORT & EXPORT LIVINGSTON & SOUTHARD, INC.
FORENTRACO

Scrap Prices *(Effective Jan. 31, 1956)*

Pittsburgh

No. 1 hvy. melting	$50.00 to $51.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 bundles	50.00 to 51.00
No. 2 bundles	42.00 to 43.00
Machine shop turn	34.00 to 35.00
Mixed bor. and ms. turn	34.00 to 35.00
Shoveling turnings	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Low phos. punch'gs plate	58.00 to 59.00
Heavy turnings	46.00 to 47.00
No. 1 RR. hvy. melting	56.00 to 57.00
Scrap rails, random lgth.	63.00 to 64.00
Rails 2 ft and under	67.00 to 68.00
RR. steel wheels	62.00 to 63.00
RR. spring steel	62.00 to 63.00
RR. couplers and knuckles	62.00 to 63.00
No. 1 machinery cast	55.00 to 56.00
Cupola cast	49.00 to 50.00
Heavy breakable cast	45.00 to 46.00

Chicago

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 factory bundles	50.00 to 52.00
No. 1 dealers' bundles	49.00 to 50.00
No. 2 dealers' bundles	38.00 to 39.00
Machine shop turn	27.00 to 28.00
Mixed bor. and turn	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. forge crops	58.00 to 59.00
Low phos. punch'gs plate	51.00 to 52.00
Low phos. 3 ft and under	54.00 to 55.00
No. 1 RR. hvy. melting	51.00 to 52.00
Scrap rails, random lgth	61.00 to 62.00
Rerolling rails	67.00 to 68.00
Rails 2 ft and under	66.00 to 67.00
Locomotive tires, cut	56.00 to 57.00
Cut bolsters & side frames	57.00 to 58.00
Angles and splice bars	64.00 to 65.00
RR. steel car axles	65.00 to 66.00
RR. couplers and knuckles	57.00 to 58.00
No. 1 machinery cast	52.00 to 53.00
Cupola cast	49.00 to 51.00
Heavy breakable cast	41.00 to 42.00
Cast iron brake shoes	38.00 to 40.00
Cast iron car wheels	47.00 to 48.00
Malleable	59.00 to 60.00
Stove plate	40.00 to 41.00

Philadelphia Area

No. 1 hvy. melting	$52.00 to $53.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles	52.00 to 53.00
No. 2 bundles	43.00 to 44.00
Machine shop turn.	36.00 to 37.00
Mixed bor. short turn	36.50 to 37.50
Cast iron borings	36.50 to 37.50
Shoveling turnings	38.50 to 39.50
Clean cast chem. borings	41.00 to 42.00
Low phos. 5 ft and under	55.00 to 56.00
Low phos. 2 ft and under	57.00 to 58.00
Low phos. punch'gs	57.00 to 58.00
Elec. furnace bundles	54.00 to 55.00
Heavy turnings	48.00 to 49.00
RR. steel wheels	59.00 to 60.00
RR. spring steel	59.00 to 60.00
Rails 18 in. and under	65.00 to 67.00
Cupola cast	52.00 to 53.00
Heavy breakable cast	53.00 to 54.00
Cast iron car wheels	58.00 to 59.00
Malleable	66.50 to 67.50
Unstripped motor blocks	39.00 to 40.00
No. 1 machinery cast	56.00 to 57.00

Cleveland

No. 1 hvy. melting	$50.00 to $51.00
No. 2 hvy. melting	39.50 to 40.50
No. 1 bundles	50.00 to 51.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	50.00 to 51.00
Machine shop turn.	30.50 to 31.50
Mixed bor. and turn.	34.00 to 35.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.50 to 35.50
Cut struct'r'l & plates, 2 ft & under	59.00 to 60.00
Drop forge flashings	50.50 to 51.50
Low phos. punch'gs, plate	50.50 to 51.50
Foundry steel, 2 ft & under	54.00 to 55.00
No. 1 RR. heavy melting	51.00 to 52.00
Rails 2 ft and under	71.00 to 72.00
Rails 18 in. and under	72.00 to 73.00
Railroad grate bars	40.00 to 41.00
Steel axle turnings	34.00 to 35.00
Railroad cast	57.00 to 58.00
No. 1 machinery cast	56.00 to 57.00
Stove plate	53.00 to 54.00
Malleable	58.00 to 59.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles	53.00 to 54.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	31.00 to 32.00
Shoveling turnings	36.50 to 37.50
Cast iron borings	36.50 to 37.50
Low phos. plate	54.00 to 55.00

Buffalo

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 busheling	48.00 to 49.00
No. 1 bundles	48.00 to 49.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	54.00 to 55.00
Scrap rails, random lgth.	51.00 to 52.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	55.00 to 56.00
RR. spring steel	55.00 to 56.00
RR. couplers and knuckles	55.00 to 56.00
No. 1 machinery cast	52.00 to 53.00
No. 1 cupola cast	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$45.50 to $46.50
No. 2 hvy melting	34.50 to 35.50
No. 1 bundles, openhearth	45.50 to 46.50
No. 2 bundles	33.50 to 34.50
New busheling	45.50 to 46.50
Drop forge flashings	45.00 to 46.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	25.00 to 26.00
Low phos. punch'gs, plate	48.50 to 49.50
No. 1 cupola cast	45.00 to 46.00
Heavy breakable cast	38.00 to 39.00
Stove plate	39.00 to 40.00
Automotive cast	49.00 to 50.00

St. Louis

No. 1 hvy. melting	$41.50 to $42.50
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	43.00 to 44.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	28.00 to 29.00
Cast iron borings	30.00 to 31.00
Shoveling turnings	30.00 to 31.00
No. 1 RR. hvy. melting	49.00 to 50.00
Rails, random lengths	58.50 to 59.50
Rails 18 in. and under	65.00 to 66.00
Locomotive tires uncut	55.50 to 56.50
Angles and splice bars	58.00 to 59.00
Std. steel car axles	60.00 to 61.00
RR. specialties	57.00 to 58.00
Cupola cast	49.00 to 50.00
Heavy breakable cast	40.00 to 41.00
Cast iron brake shoes	38.00 to 39.00
Stove plate	40.00 to 41.00
Cast iron car wheels	47.00 to 48.00
Rerolling rails	63.00 to 64.00
Malleable	50.00 to 51.00
Unstripped motor blocks	40.00 to 41.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	45.00 to 46.00
Elec. furnace, 3 ft & under	48.00 to 49.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and short turn.	26.00 to 27.00
Shoveling turnings	29.00 to 29.50
Clean cast chem. borings	27.00 to 28.00
No. 1 machinery cast	47.00 to 48.00
Mixed cupola cast	41.50 to 42.50
Heavy breakable cast	41.00 to 42.00
Stove plate	37.00 to 38.00
Unstripped motor blocks	26.00 to 27.00

New York

Brokers buying prices per gross ton, on cars

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	40.00 to 41.00
No. 2 bundles	32.00 to 34.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	26.00 to 27.00
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast	49.00 to 50.00
Mixed yard cast	46.00 to 47.00
Charging box cast	46.00 to 47.00
Heavy breakable cast	46.00 to 47.00
Unstripped motor blocks	31.00 to 32.00

Birmingham

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	43.00 to 44.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	43.00 to 44.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	19.00 to 20.00
Electric furnace bundles	46.00 to 47.00
Bar crops and plate	52.00 to 53.00
Structural and plate, 2 ft	51.00 to 52.00
No. 1 RR hvy. melting	51.00 to 52.00
Scrap rails, random lgth.	59.00 to 60.00
Rails, 18 in. and under	64.00 to 65.00
Angles & splice bars	57.00 to 58.00
Rerolling rails	62.00 to 63.00
No. 1 cupola cast	47.50 to 48.50
Stove plate	46.00 to 47.00
Charging box cast	32.00 to 33.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	39.00 to 40.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	39.50 to 40.50
No. 1 bundles	46.00 to 47.00
No. 2 bundles	36.50 to 37.50
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	30.00 to 31.00
Low phos. 18 in. & under	56.00 to 57.00
Rails, random lengths	61.00 to 62.00
Rails, 18 in. and under	67.00 to 68.00
No. 1 cupola cast	46.00 to 47.00
Hvy. breakable cast	44.00 to 45.00
Drop broken cast	55.50 to 56.50

San Francisco

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	42.00
No. 1 bundles	43.00
No. 2 bundles	38.00
No. 3 bundles	29.00
Machine stop turn.	23.00
Cast iron borings	23.00
No. 1 RR. hvy. melting	44.00
No. 1 cupola cast	50.00

Los Angeles

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 1 bundles	41.00
No. 2 bundles	33.00
No. 3 bundles	29.00
Machine shop turn.	20.00
Shoveling turnings	23.00
Cast iron borings	20.00
Elec. furn. 1 ft and under	42.00
No. 1 RR. hvy. melting	42.00
No. 1 cupola cast	48.00

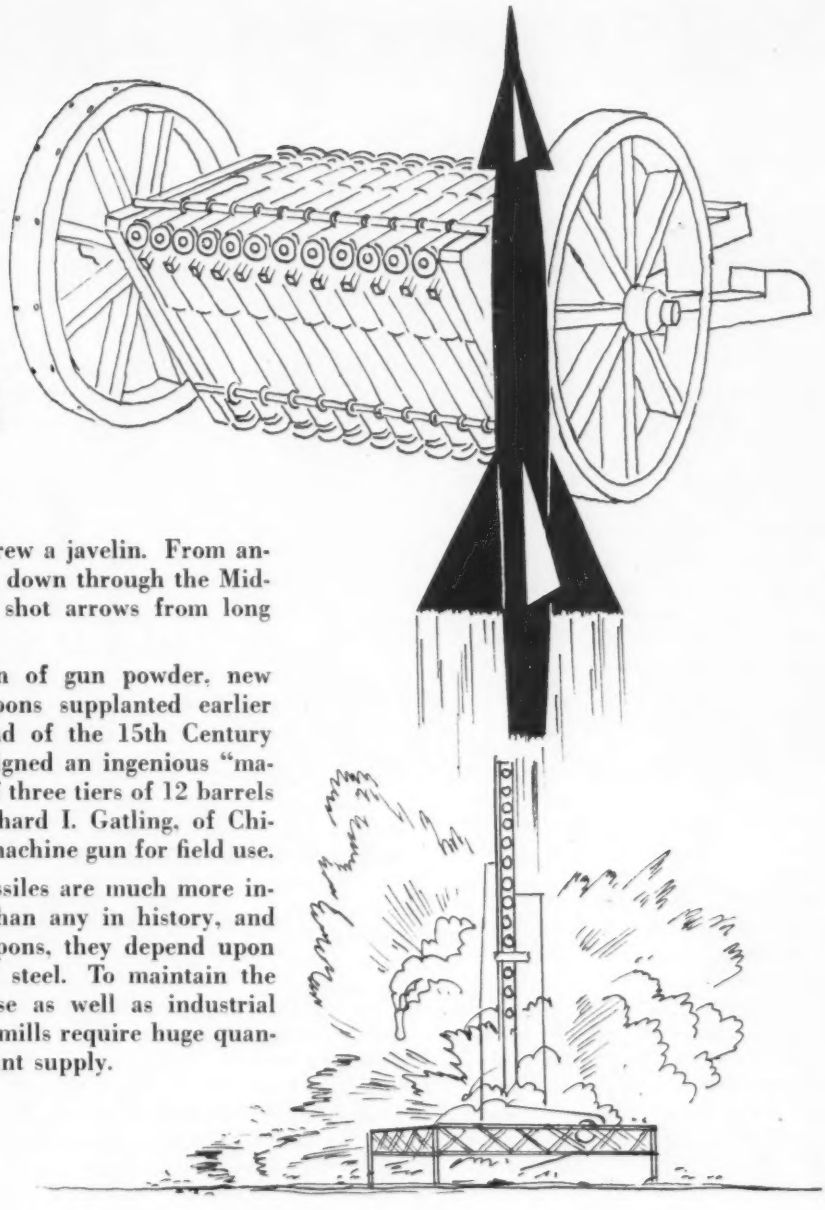
Seattle

No. 1 hvy. melting	$48.00
No. 2 hvy. melting	44.00
No. 2 bundles	38.00
No. 3 bundles	30.00
No. 1 cupola cast	45.00
Mixed yard cast	45.00

Hamilton, Ont.

No. 1 hvy. melting	$45.50
No. 2 hvy. melting	41.50
No. 1 bundles	45.50
No. 2 bundles	38.00
Mixed steel scrap	39.50
Bushelings	35.50
Bush., new fact., prep'd	43.50
Bush., new fact., unprep'd.	39.50
Machine shop turn.	18.00
Short steel turn.	27.50
Mixed bor. and turn.	$16.00 to 19.00
Rails, rerolling	53.50
Cast scrap	42.00 to 45.00

guided missiles



Prehistoric man threw a javelin. From ancient Egypt and Assyria down through the Middle Ages, foot soldiers shot arrows from long bows and cross bows.

With the invention of gun powder, new and more deadly weapons supplanted earlier missiles. About the end of the 15th Century Leonardo Da Vinci designed an ingenious "machine gun" consisting of three tiers of 12 barrels each. In 1862 Dr. Richard I. Gatling, of Chicago, invented a small machine gun for field use.

Today's guided missiles are much more ingenious and complex than any in history, and like most military weapons, they depend upon an unfailing supply of steel. To maintain the requirements of defense as well as industrial and civilian needs, the mills require huge quantities of scrap in constant supply.

For the purchase or sale of iron or steel scrap . . .

phone or write "Your Chicago Broker"

M.S. KAPLAN COMPANY

231 S. La Salle St., Chicago

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Strikes Affect The Market

Serious threat, court order and continued idleness are major developments as labor stop-and-go keeps the market off balance . . . Zinc, lead, tin and copper involved.

◆ STRIKES continue to keep the nonferrous markets off balance. Joining copper in the headlines are zinc, lead and tin.

COPPER . . . As of early this week, the Laurel Hill, N. Y., refinery of Phelps Dodge Copper Co. was still on strike. Total copper production lost due to the shutdown had reached about 9000 tons. Latest meeting between union and management ended with no decision. Issues are still very cloudy and there is a good chance that the plant will be strikebound for another full week. At a rate of about 450 tons per day, this will bring the total lost production to about 12,000 tons. This would almost certainly make custom smelters consider a cent or two per lb price hike.

Revere Copper & Brass Co. announced cessation of hostilities at its Detroit and New Bedford, Mass., plants with probable settlement in sight at its Chicago plant. These operations were strikebound for three months. A spokesman for Revere indicated that the new three-year contract included a cost of living escalator clause, an improved pension plan and a 10¢ per hour wage increase. Peace on the copper front is always good news, but these plants are fabricators. Even considering the possibility of a stockpile caused by the inactivity, they will no doubt increase the demand for electrolytic copper, already in seriously short supply.

ZINC AND LEAD . . . News is good. The strike of dockworkers in Australia, one of the world's leading producers of both lead and zinc, has been declared illegal by a Federal Arbitration Court. Acting on a shipowner's application, the court ordered members of the Waterside Workers Federation not to take part in a stoppage of work. Although the strike was in effect for only five days before the judicial decision, it had closed 53 ports and was causing increasing unemployment. The London Metal Market reacted to the order in the expected manner with easing in prices. The order saw a distinct easing based on the expected early resumption of activity.

TIN . . . The good news that Malaya had increased its production, 61,400 long tons in 1955 as compared to 60,691 in 1954, was offset by the bad news that there was a strong possibility of a strike of 18,000 mine workers, enough to paralyze the entire tin industry in Malaya. The union is seeking wages for one rest day per week. Management agrees in principle but is in sharp difference over the extent to which it should be retroactive. Mine Employers Assn. offers to pay the workers from December 1955. The union demands payment from November 1954. Union delegates walked out of the negotiating conference. Indications are that unless the talks are begun again within a week or so, the strike will materialize. It could have serious repercussions considering the fact that the Malayan increase in 1955 production was offset by a decrease in the world's second and third largest producers, Indonesia and Bolivia.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Jan. 25	Jan. 26	Jan. 27	Jan. 28	Jan. 30	Jan. 31
Copper, electro, Conn.	43.00	43.00	43.00	....	43.00	43.00
Copper, Lake, delivered	43.00	43.00	43.00	....	43.00	43.00
Tin, Straits, New York	103.375	102.75	101.75	102.50	102.00	102.00*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	16.30	16.30	15.80	15.80	15.80	15.80

Note: Quotations are going prices. **Tentative*

ALUMINUM . . . Members of the Aluminum Assn. re-elected Everett G. Fahlman, president of the Permold Co., Medina, O., Association president. Arthur V. Davis, chairman of the board of Aluminum Company of America, was re-elected board chairman. Archie P. Cochran, president of the Cochran Foil Co., Louisville, Ky., and John W. Douglas, president of Republic Foil and Metal Mills Inc., Danbury, Conn., were re-elected directors-at-large for three year terms. C. A. Macfie, president of Revere Copper & Brass Inc., was also elected a director.

Russell A. Blanchard, general sales manager, Detroit Casket & Manufacturing Co.—chairman, extruded products div.; Howard J. Geraghty, president of Johnston Foil Manufacturing Co., St. Louis—chairman, foil div.; J. Frank Seeley, sales manager, casting div. of Bohn Aluminum & Brass Corp., Detroit — chairman, foundry div.; L. M. Brile, president, Fairmont Aluminum Co., Fairmont, W. Va.—chairman, sheet div.; R. W. Goss, sales supervisor of aluminum mill products, Scovill Manufacturing Co., Waterbury, Conn.—chairman, rolled bar, rod and wire div.

NICKEL . . . President Eisenhower has asked for a complete investigation into the operations of the Nicaro, Cuba, nickel plant which he could use as a basis for taking action. A House subcommittee on government operations is looking into the appointment of National Lead Co. as prime contractor and also selection of a Chicago firm as insurance brokers.

NEW PLANT . . . Kennecott Copper Corp. has taken an option on 120 acres near Buffalo, N. Y. The company is definitely considering putting a new plant here but insists that no decisions along this line have been made. There is a possibility that a new Kennecott plant here would produce some other metal besides copper.

HELIARC Cutting

TRADE-MARK

CUTS ALUMINUM AT SPEEDS UP TO 300 INCHES PER MINUTE

HELIARC cutting, a new process developed by LINDE, brings all the desired features of economical high-speed operations to the cutting of aluminum.

★ **Speeds never before possible:** Normal mechanized cutting speeds are 300 in. per min. in ¼-in. material, 125 in. per min. in ½-in. material, 75 in. per min. in ¾-in. material, and 50 in. per min. in 1-in. plate. If desired, lower speeds can be obtained by simply adjusting the controls.

★ **Straight lines, bevels, contours—no problem:** The new HELIARC cutting process can be used mechanically or manually. Both setups produce high-quality straight line cuts, bevels, circles, and shapes with revolutionary new speed and efficiency.

HELIARC cutting employs a high-temperature, high-velocity, constricted arc between a tungsten electrode and the piece to be cut. The concentrated, columnated energy of the arc stream melts and ejects a thin section of metal to form a kerf. The gas atmosphere (a combination of argon and hydrogen) prevents oxidation of the cut face.

Learn the details of how HELIARC cutting can help you increase production and cut operating costs. Call your LINDE Representative today.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
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Linde
Trade-Mark

Nonferrous Prices *(Effective Jan. 31, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1100, 3003	40.8	38.7	37.5	36.5
5052	48.3	43.4	41.7	39.9
6061-0	45.4	41.2	39.4	39.3

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
5– 8	41.6–43.3	56.6–60.2
12–14	42.3–43.7	57.5–61.8
24–26	45.3–45.7	67.7–72.1
36–38	53.6–54.2	90.5–94.3

Screw Machine Stock—2011-T-3

Size"	¼	5/16–⅝	¾–1	1¼–1½
Price	54.5	53.4	52.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length" →	72	96	120	144
.019 gage	$1.295	$1.727	$2.160	$2.590
.024 gage	1.615	2.162	2.692	3.232

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 61¢; 3/16 in., 62¢; ½ in., 61¢; 0.064 in., 78¢; 0.032 in., 99¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: FS, diam ¼ to 0.311 in., 82.5¢; ½ to ¾ in., 65¢; 1¼ to 1.749 in., 60.5¢; 2½ to 5 in., 57¢. Other alloys higher. Base up to ¾ diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 70.7¢; 0.22 to 0.25 lb, 5.9 in., 66.9¢; 0.50 to 0.59 lb, 8.6 in., 63¢; 1.8 to 2.59 lb, 19.5 in., 60.8¢; 4 to 6 lb, 28 in., 57.7¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: FS, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.625; 5/16 to ⅜ in., $1.475; ½ to ⅝ in., $1.105; 1 to 2 in., 92.5¢; 0.165 to 0.219 in. wall: OD ⅝ to ⅞ in., 75.5¢; 1 to 2 in., 71.5¢; 3 to 4 in., 70.5¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	63.13	....	63.48
Copper, h-r	58.76	59.11	....
Copper, drawn	....	60.36	....
Low brass	57.75	58.29	....
Yellow brass	53.60	53.54	....
Red brass	59.24	59.18	....
Naval brass	52.83	51.41	48.40
Leaded brass	....	....	48.42
Com. bronze	61.28	61.82	....
Mang. bronze	59.39	53.38	54.94
Phos. bronze	82.51	81.50	....
Muntz metal	53.74	49.55	50.80
Ni silver 10 pct	66.00	68.33	70.68

Beryllium copper Cr, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.84
Rod, bar, wire	1.81

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless Tube	122	110	153
Shot, Blocks	....	71	....

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $13.10-$13.60; alloy $16.25-$15.75; Plate, HR, commercially pure, $10.50-$11.00; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.50-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.90-$8.15; alloy, $7.90-$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed	24.40
Aluminum pig	22.50
Antimony, American, Laredo, Tex.	33.50
Beryllium copper, per lb conta'd Be	$43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	43.00
Copper, Lake, delivered	43.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $120
Lead, St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	32.50
ingot	33.25
Magnesium, sticks, 100 to 500 lb	53.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$271 to $275
Nickel electro	64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$23 to $24
Platinum, dollars per troy oz.	$97 to $107
Silver, New York, cents per troy oz.	90.00
Tin, New York	102.00*
Titanium sponge, grade A-1	$3.15 to $3.45
Zinc, East St. Louis	13.50
Zinc, New York	14.00
Zirconium, sponge	$10.00

* Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	42.00
No. 120	41.25
No. 123	40.50
80-10-10 ingot	
No. 305	45.75
No. 315	44.00
88-10-2 ingot	
No. 210	58.25
No. 215	54.75
No. 245	48.75
Yellow ingot	
No. 405	33.25
Manganese bronze	
No. 421	37.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	32.00-32.75
0.60 copper max.	31.75-32.50
Piston alloys (No. 122 type)	33.25-33.75
No. 12 alum. (No. 2 grade)	30.50-31.00
108 alloy	30.50-31.00
195 alloy	32.50-33.25
13 alloy (0.60 copper max.)	31.75-32.50
AXS-679	30.50-31.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	31.00-31.75
Grade 2—92-95%	30.00-30.75
Grade 3—90-92%	29.00-29.75
Grade 4—85-90%	28.50-29.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	39	38¼
Yellow brass	28⅞	28⅝
Red brass	34¼	33⅛
Comm. bronze	35⅝	35
Mang. bronze	27	25⅝
Yellow brass rod ends	28⅝	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	42½
No. 2 copper wire	41
Light copper	38½
*Refinery brass	38—38½

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	42.50
No. 2 copper wire	41
Light copper	38½
No. 1 composition	34½
No. 1 comp. turnings	34
Hvy. yellow brass solids	24½
Brass pipe	28
Radiators	26
Aluminum	
Mixed old cast	21½—22½
Mixed new clips	22 —23½
Mixed turnings, dry	21½—22½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	40 —40½
No. 2 heavy copper and wire	38 —38½
Light copper	36 —36½
New type shell cuttings	34½—35
Auto radiators (unsweated)	23½—24
No. 1 composition	31 —31½
No. 1 composition turnings	29 —29½
Unlined red car boxes	25 —25½
Cocks and faucets	24½—25
Clean heavy yellow brass	20 —20½
Brass pipe	25 —25½
New soft brass clippings	26 —26½
No. 1 brass rod turnings	23½—24

Aluminum

Alum. pistons and struts	18 —18½
Aluminum crankcases	16¾—17¼
1100 (2S) aluminum clippings	20½
Old sheet and utensils	16¾—17¼
Borings and turnings	11½—12
Industrial castings	16¾—17¼
2024 (24s) clippings	18½—19

Zinc

New zinc clippings	8½— 9
Old zinc	6 — 6½
Zinc routings	4¼
Old die cast scrap	3½

Nickel and Monel

Pure nickel clippings	$1.50
Clean nickel turnings	$1.25
Nickel anodes	$1.50
Nickel rod ends	$1.50
New Monel clippings	60
Clean Monel turnings	50
Old sheet Monel	55
Nickel silver clippings, mixed	25
Nickel silver turnings, mixed	21

Lead

Soft scrap lead	12½—13
Battery plates (dry)	6¾— 7
Batteries, acid free	4½

Magnesium

Segregated solids	18½—19
Castings	17½—18

Miscellaneous

Block tin	83 —84
No. 1 pewter	66 —67
Auto babbitt	43½—44½
Mixed common babbitt	15½
Solder joints	20¾—21¼
Siphon tops	50
Small foundry type	16¼—16½
Monotype	14¾—15¼
Lino. and stereotype	14 —14½
Electrotype	12¼—12¾
Hand picked type shells	10½—11
Lino. and stereo. dross	5¾— 6
Electro. dross	4¾— 5

IRON AGE

STEEL PRICES

(Effective Jan. 31, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,SI0*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													13.45 *C11*
	Harrison, N. J.													
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7* *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*					
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	8.00 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			5.10 *C16* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.825 *C16*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

STEEL PRICES

(Effective Jan. 31, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			5.375 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Conshohocken, Pa.													
	Coatesville, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.025 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.125 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.325 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.025 *A5, N4,R3*			
	Sterling, Ill.										5.375 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.025 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1,Y1*	5.325 *I3, U1,Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1,I3*	7.875 *U1, Y1*			5.025 *Y1*	$9.20 *I3, U1,Y1*	$7.90 *I3, U1,Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.			5.85 *C9*							5.475 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3,N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1,P6*	5.325 *J3, U1,P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *A5 P6*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.375 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5,F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.025 *Y1*			
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.275 *S2*			
	Los Angeles, Torrance, Cal.										5.825 *B2*			
	Minnequa, Colo.										5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3, T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.275 *S2*			

IRON AGE

STEEL PRICES

(Effective Jan. 31, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	6.30 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.60 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.25 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.70 *W10*		7.60 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.80 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.35 *B3*
	Palmer, Worcester, Readville, Mass.			6.70 *W11* 6.45 *C14* 6.70 *B5*		7.725 *A5,B5*		4.50 *R3*				6.55 *A5* 6.90 *W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E2*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	5.90 *A5,L2* 6.25 *B5, W8, W10*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,A1,R3*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.25 *A5,R3, N4,W7,*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.25 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.45 *B5* 6.15 *P3* 6.10 *P8*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3 P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.25 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.70 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.60 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	5.90 *A5,C8, C11,J3* 6.25 *B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.25 *A5,J3, P6*
	Portsmouth, Ohio											6.60 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	5.90 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10 F2*	6.80 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.50 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.20 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.825 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.25 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.50 *S2*

Steel Prices *(Effective Jan. 31, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	7.00	+2.25	10.00	+5.25	12.50	+4.75	15.00	+3.00	15.50	+2.00	16.00	+1.50	17.50	+0.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	16.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	11.50	.....	15.50	.....	17.50	.....	18.00	.....	18.50	.....	19.00	.....	19.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium ..... .77
Oil hardened manganese ..... .43
Special carbon ..... .39
Extra carbon ..... .33
Regular carbon ..... .275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (*S9*) Copper, 10 pct, 2 sides, 38.00; 1 side, 30.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

LAKE SUPERIOR ORES

51.50% *Fe; natural content, delivered lower Lake ports. Prices effective for 1956 season. Freight for buyer's account.*

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.10
Mesabi, nonbessemer	10.95
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9–15½ ga.	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	152	162	...	173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162	...	...	...	7.40	7.80
Atlanta *A8*	154	167	...	175	180	7.50	8.025
Bartonville *K2**	154	168	...	175	181	7.50	8.075
Buffalo *W6*	...	...	...	...	...	7.40	7.80
Chicago, Ill. *N4***	152	166	...	173	179	7.40	8.00
Cleveland *A6*	157	...	...	...	...	7.40	.....
Cleveland *A5*	...	...	...	...	...	7.40	.....
Crawfordsville *M4**	154	167	...	175	175	7.50	8.05
Donora, Pa. *A5*	152	162	...	173	175	7.40	7.80
Duluth *A5*	152	162	...	173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162	...	173	175	7.40	7.80
Galveston *D4*	157	...	...	...	...	...	.....
Houston *S2*	167	170	...	...	180	7.65	8.05
Johnstown, Pa. *B3**	152	166	...	...	175	7.40	7.80
Joliet, Ill. *A5*	152	162	...	173	175	7.40	7.80
Kokomo, Ind. *C9*	154	154	...	175	177	7.50	7.90
Los Angeles *B2**	...	...	...	...	...	8.35	8.925
Kansas City *S2*	167	174	...	178	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162	...	...	...	7.40	7.80
Moline, Ill. *R3*	...	162	162	...	...	...	.....
Pittsburg, Cal. *C7*	171	185	...	...	195	8.35	8.75
Portsmouth *P7*	...	...	...	...	...	7.40	.....
Rankin, Pa. *A5*	152	162	...	...	175	7.40	7.80
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*	...	...	...	197	195	8.35	8.75
Sparrows Pt. *B3**	154	...	...	175	181	7.50	8.075
Struthers, O. *Y1*	...	...	...	...	...	7.40	7.90
Worcester *A5*	158	...	...	...	...	7.70	.....
Williamsport, Pa. *S5*	...	...	160	...	...	...	.....

Galvanized products computed with zinc at 5¢ per lb. Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bristol, Conn. *W12*	.....	.....	10.80	12.95	15.65
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*	.....	9.05	10.60	12.75	15.35
Cleveland *A5*	7.10	9.05	10.60	12.75	15.45
Detroit *D1*	7.20	9.15	10.70	12.85	.....
Detroit *D2*	7.20	9.15	10.70	.....	.....
Harrison, N. J. *C11*	.....	.....	10.80	12.95	15.65
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	.....
New Haven, Conn. *D1*	7.55	9.35	10.90	13.05	.....
Pawtucket, R. I. *N7*	7.55	9.25	10.80	12.95	15.65
Pittsburgh *S7*	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. *A1*	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. *S1*	7.10	9.05	10.60	12.75	15.45
Trenton *R4*	.....	.....	.....	.....	.....
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50	.....	.....
Worcester, Mass. *A5*	7.65	9.35	10.90	13.05	15.75
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alley Bars: Hot-Rolled 4615 As rolled	Alley Bars: Hot-Rolled 4140 Annealed	Alley Bars: Cold-Drawn 4615 As rolled	Alley Bars: Cold-Drawn 4140 Annealed
Baltimore	10	7.03	8.32	8.37	7.65	.....	7.21	7.93	7.61	8.62	14.38	13.44–13.96	16.36	16.29–16.49
Birmingham	.15	6.88	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	7.70	8.81–9.36	10.27	7.94–7.96	10.30	7.89	8.13	7.83	9.53	12.15–13.80	13.40–13.45	16.65	16.50
Buffalo	.15	7.05	8.30	10.00	7.35	.....	7.35	7.60	7.35	8.05	.....	13.50	.....	16.60
Chicago	.15	7.15	8.39	8.80	7.36	.....	7.29	7.58	7.42	7.75	13.20	12.85	16.05	15.90
Cincinnati	.15	7.27	8.38	9.20	7.60	.....	7.58	8.05	7.66	8.05	13.44	13.09	16.29	16.14
Cleveland	.15	7.15	8.39	9.10	7.46	.....	7.46	7.91	7.48	7.85	.....	12.91	.....	15.96
Denver		8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.15	6.99	8.28	8.78	7.34	8.15	7.27	7.75	7.38	8.04	13.40	13.05	16.25	16.50
Houston		7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85–9.95	14.35	14.00	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.05	10.00	11.00	8.35	.....	8.05	8.30	8.05	10.70	.....	14.25	.....	17.85
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.15	7.24	8.48	8.89	7.45	.....	7.38	7.75	7.51	7.94	.....	12.94	.....	15.99
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.46	8.68	9.44	8.07	11.10	7.76	7.99	7.96	9.82	13.63	13.28	16.48	16.33
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.14	8.42	9.35	7.67	.....	7.37	7.74	7.64	8.46	13.36–13.51	13.16	16.36	16.21
Pittsburgh	.15	6.86	8.09	9.20	7.16	9.00	6.99	7.28	7.08	7.85	13.20	12.85	16.05	15.90
Portland		7.80–8.60	8.80–10.15	10.65	8.00	7.95	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.10	9.65	10.15	8.35	.....	8.05	8.25	8.05	11.20*	.....	14.25	.....	17.85
Seattle	.40	8.55	10.40	10.80	8.65	.....	8.20	8.30	8.35	12.10	.....	14.60	.....	17.65
St. Louis	.15	7.44	8.68	9.49	7.65	.....	7.58	7.98	7.71	8.14	13.69	13.14	16.35	16.19
St. Paul	.25	7.46	8.59–9.14	9.16	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

* Plus analysis charge.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.93	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
National Tube	2	13	30.87	36.51	29.93	.....
	2½	12	42.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
Pittsburgh Steel	2	13	30.87	36.51	.....	.....
	2½	12	41.57	49.16	.....	.....
	3	12	47.99	56.76	.....	.....
	3½	11	56.03	66.27	.....	.....
	4	10	74.41	88.00	.....	.....

(Effective Jan. 31, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	4.725	5.65	5.825	....	....	....	....
So. Chicago *R3*	....	....	....	7.90	....	....	....
Ensley *T2*	4.725	5.65	....	....	....	....	....
Fairfield *T2*	....	5.65	....	7.90	....	5.625	....
Gary *U1*	4.725	5.65	....	....	....	5.625	....
Ind. Harbor *I3*	4.725	....	5.825	7.90	....	5.625	....
Ind. Harbor *Y1*	....	....	....	7.90	....	....	....
Johnstown *B3*	....	5.65	....	....	....	....	....
Joliet *U1*	....	5.65	5.825	....	....	....	....
Kansas City *S2*	....	....	....	7.90	....	....	....
Lackawanna *B3*	4.725	5.65	5.825	....	....	5.625	....
Lebanon *B3*	....	....	....	....	....	....	12.15
Minnequa *C6*	4.725	6.15	5.825	7.90	....	5.625	12.15
Pittsburgh *O1*	....	....	....	....	11.90	....	12.15
Pittsburgh *P5*	....	....	....	....	....	....	12.15
Pittsburgh *J3*	....	....	....	7.90	....	....	....
Seattle *B2*	....	....	....	8.40	....	5.775	12.65
Steelton *B3*	4.725	....	5.825	....	....	5.625	....
Struthers *Y1*	....	....	....	7.90	....	....	....
Torrance *C7*	....	....	....	....	....	5.775	....
Williamsport *S5*	....	5.65	....	....	....	....	....
Youngstown *R3*	....	....	....	7.90	....	....	....

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. .....$14.00 to $14.50
Foundry, beehive (f.o.b. oven)
Connellsville, Pa. .....$16.00 to $16.50
Foundry, oven coke
Buffalo, del'd $28.08
Chicago, f.o.b. 25.75
Detroit, f.o.b. 26.25
New England, del'd 28.55
Seaboard, N. J., f.o.b. 25.50
Philadelphia, f.o.b. 25.00
Swedeland, Pa., f.o.b. 25.00
Plainesville, Ohio, f.o.b. 25.50
Erie, Pa., f.o.b. 25.00
Cleveland, del'd 27.43
Cincinnati, del'd 26.56
St. Paul, f.o.b. 23.75
St. Louis, f.o.b. 26.00
Birmingham, f.o.b. 24.40
Lone Star, Tex., f.o.b. 19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
6	60	27.25	12	60	11.75
4	40	30.25	10	60	11.90
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 58.92
Electrodeposited 55.25
Brass, 80-20, ball anodes, 2000 lb or more 58.00
Zinc, ball anodes, 2000 lb lots ... 20.75
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon.. 90.50
(rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical. $1.06 to $1.10

Chemicals

(Cents per lb, fob shipping point)

Copper cyanide, 100 lb drum 83.50
Copper sulphate, 5 or more 100 lb bags, per cwt 18.15
Nickel salts, single, 4-100 lb bags.. 33.25
Nickel chloride, freight allowed, 300 lbs 43.50
Sodium cyanide, domestic, fob N. Y. 1 to 4 200 lb drums 21.55
(Philadelphia add .50 per lb)
Zinc cyanide, 100 to 900 lb 55.55
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 1 to 20 100 lb drums 31.20

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case Quantity	Full case 20,000 lb. or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex., H.P., reg. & hvy.

¾" or smaller	64	66
⅞" to 1¼" inclusive	63	65
1⅜" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P Hex regular & hvy

¾" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex. Nuts

¾" and smaller	66	66
⅞" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

Base per 100 lb

½ in. and larger $9.95

Pct Off List

7/16 in. and smaller 32

Cap Screws

	Discount H.C. Heat
Bright Treated	
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34 20
9/16 and ⅝" x 6" and smaller and shorter	31 16
¾", ⅞", 1" x 6" and shorter	9 +11
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49 41
9/16" and ⅝" diam. x 6" and shorter	43 39
¾", ⅞", 1" x 6" and shorter	31 20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Packaged, package list ...	27	38
Bulk, bulk list		
Quantity		
¼-in. diam. & under } 25,000-200,000	20	61
5/16-in. diam. & larger } 15,000-100,000	20	61
All diam. over 3 in. long } 5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
Packaged, package list ...	24	27
Bulk, bulk list		
Quantity		
⅜-in. diam. & smaller } 25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	109.3
New York	121.5
Chicago	122.9
San Francisco-L. A.	131.1

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa., (except Salina, Pa., add $5.00) $122.00
No. 1 Ohio 114.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 114.00
No. 2 Ohio 98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala. $128.00
Childs, Hays, Pa. 138.00
Chicago District 138.00
Western Utah 144.00
California 151.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O. 145.00
Curtner, Calif. 163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 21.00
Silica cement, net ton, bulk, Hays, Pa. 24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala. 22.00
Silica cement, net ton, bulk, Utah and Calif. 32.00

Chrome Brick

Per net ton

Standard chemically bonded, balt. $91.00
Standards chemically bonded, Curtner, Calif. 101.25
Burned, Balt. 85.00

Magnesite Brick

Standard Baltimore $114.00
Chemically bonded, Baltimore 102.00

Grain Magnesite

St. ¾-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed $64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 40.00
in sacks 46.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $15.00
Midwest 15.60
Missouri Valley 14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags ... 9.50¢
Canadian sponge iron, Del'd in East, carloads ... 9.5¢
Domestic sponge, iron, 98+% Fe, carload lots ..... 9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe ..... 37.5¢
domestic 99.5+% Fe ..... 36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe 57.0¢
Electrolytic iron melting stock, 99.84% pure ..... 23.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe..86.0¢ to $1.55
Aluminum freight allowed 34.50¢
Brass, 10 ton lots .....37.50¢ to 50.00¢
Copper, electrolytic ..... 61.50¢
Copper, reduced ..... 61.50¢
Cadmium, 100-199 lb. 95¢ plus metal value
Chromium, electrolytic, 99% min., and quality, del'd.. $3.60
Lead .....7.50¢ plus metal value
Manganese ..... 70.0¢
Molybdenum, 99% .....$3.00 to $3.25
Nickel, unannealed $1.00
Nickel, annealed $1.06
Nickel, spherical, unannealed, #80 ..... $1.18
Silicon ..... 43.50¢
Solder powder .7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 99.0¢
Stainless steel, 316 ..... $1.32
Tin .....14.00¢ plus metal value
Tungsten, 99% (65 mesh) .. $4.30
Zinc, 10 ton lots .....18.75¢ to 32.50¢

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BERTSCH & COMPANY, CAMBRIDGE CITY • INDIANA

Ferroalloy Prices

(Effective Jan. 31, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.06% C	36.50	0.50% C	35.25
0.10% C	36.00	1.00% C	34.00
0.15% C	35.75	2.00% C	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si ... 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.00% Si ... 25.00

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads ... 27.35
Ton lots ... 30.55
Less ton lots ... 32.05

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 3¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C ... $1.27
0.50% max. C ... 1.27
9 to 11% C, 88-91% Cr, 0.75% Fe ... 1.36

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads ... 41.85
Ton lots ... 46.15
Less ton lots ... 48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.

30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads ... 22.95
Ton lots ... 25.25
Less ton lots ... 26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads ... 23.05
Ton lots ... 24.95
Less ton lots ... 25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ⅛ in. x 12 mesh.

Ton lots ... 19.65
Less ton lots ... 20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots ... 17.20
Ton lots ... 18.70
Less ton lots ... 19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed ... 18.50
Ton lots to carload packed ... 19.65
Less ton lots ... 20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.25
Johnstown, Pa.	10.25
Sheridan, Pa.	10.25
Philo, Ohio	10.25
S. Duquesne	10.25

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk ... 12.50
Ton lots packed ... 14.70

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$89.50
19 to 21%	3% max.	91.50
21 to 23%	3% max.	94.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, Packed ... 45.75
Ton lots ... 44.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads ... 30.00
Ton lots ... 32.00
250 to 1999 lb ... 34.00
Premium for hydrogen-removed metal ... 0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ... 22.35

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	35.55	36.75
0.07% max. C	30.95	33.50	34.70
0.15% max. C	29.45	32.00	33.20
0.30% max. C	27.95	30.50	31.70
0.50% max. C	27.45	30.00	31.20
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	24.45	27.00	28.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk ... 11.50
Ton lots ... 12.95
Briquet contract basis carloads, bulk, delivered, per lb of briquet ... 13.15
Ton lots, packed ... 15.35

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $98.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk ... 7.15
Ton lots, packed ... 9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
	90% Si	18.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth ... 3.10
Crucible ... 3.20
High speed steel (Primos) ... 3.30

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads ... 10.65¢
Ton lots ... 11.80¢

Calcium molybdate, 43.6-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo ... $1.34

Ferrocolumbium, 50-60%, 2 in.

x D contract basis, delivered per pound contained Cb.

Ton lots ... $6.90
Less ton lots ... 6.95

Ferro-tantalum-columbium, 20%

Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta ... $4.65

Ferromolybdenum, 55-75%, 200-lb

containers, f.o.b. Langeloth, Pa., per pound contained Mo ... $1.54

Ferrophosphorus, electric, 23-

26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton ... $90.00
10 tons to less carload ... $110.00

Ferrotitanium, 40% regular grade,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.35

Ferrotitanium, 25% low carbon,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.50
Less ton lots ... $1.55

Ferrotitanium, 15 to 18% high

carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... $177.00

Ferrotungsten, ¼ x down,

packed, per pound contained W, ton lots, f.o.b. ... $3.30

Molybdic oxide, briquets, per lb

contained Mo, f.o.b. Langeloth, Pa. ... $1.33
bags, f.o.b. Washington, Pa., Langeloth, Pa. ... $1.30

Simanal, 20% Si, 20% Mn, 20%

Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump ... 17.50¢
Ton lots, packed lump ... 19.50¢
Less ton lots ... 20.00¢

Vanadium oxide, 86 - 89% V_2O_5

contract basis, per pound contained V_2O_5 ... $1.33

Zirconium contract basis, per lb

of alloy

35-40%, f.o.b. freight allowed, carloads, packed ... 26.25¢
12-15%, del'd, lump, bulk-carloads ... 8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si 40-45%, per lb contained 2 ... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound ... 45¢
Less ton lots, per pound ... 50¢

Corbortam, Ti 15-21%, B 1-2% Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed

Ton lots per pound ... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50%, max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20
F.o.b. Wash., Pa.; 100 lb up
1⁰ to 14% B ... .85
14 to 19% B ... 1.20
19% min. B ... 1.50

Grainal, f.o.b. Bridgeville, Pa. freight allowed, 100 lb and over

No. 1 ... $1.05
No. 79 ... 50¢

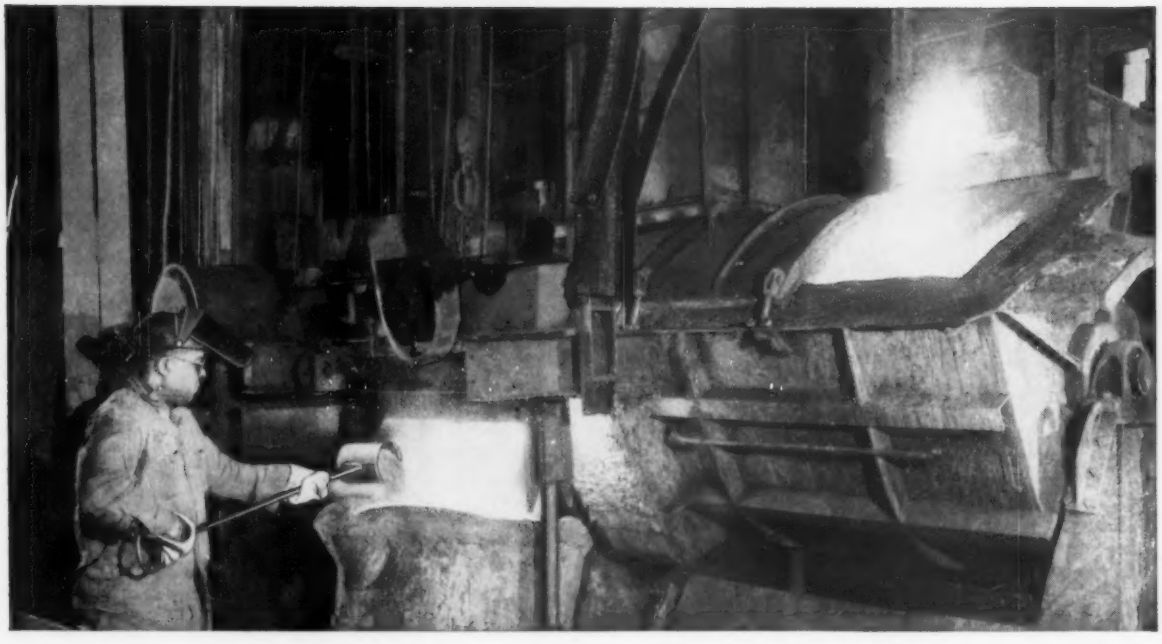
Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots ... $1.40
Less ton lots ... 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... $2.05

Silcas, contract basis, delivered.

Ton lots ... 45.00¢



ELECTROMET Supplies the Iron Foundry with Alloys for all Purposes

ELECTROMET offers you ladle or cupola addition agents for any of your foundry needs. Additions of ferro-alloys will adjust the composition of the base iron to make it suitable for the particular work on hand. You can reduce chill in thin-sectioned castings or improve strength and machinability. You can, if desired, increase hardness and improve resistance to wear and heat—all through simple additions of alloys. There is a wide variety of ELECTROMET alloys from which to choose.

ELECTROMET not only has the alloys to meet your needs, but also furnishes technical assistance in their use. Please phone or write the ELECTROMET office nearest you for detailed information on these or other ELECTROMET products.

ALLOYS FOR LADLE ADDITIONS

Ferrosilicons (50%, 75%, 85%, and 90%) In grades and sizes suitable for all conditions in the iron foundry. Silicon reduces chill in thin-section gray iron castings.

"SMZ" Alloy — A strong, super-graphitizing alloy and chill reducer. Contains zirconium and manganese to enhance the inoculating properties.

Calcium-Silicon—Inoculant for reduction of chill and for developing high-tensile strength. Especially suited for use in low carbon-equivalent irons.

Zirconium Alloys (12 to 15% and 35 to 40%) Graphitizers for reducing chill, aiding machinability, and improving tensile properties.

Ferrochromium Alloys — Available in many grades for cast iron. All grades have rapid solubility. Widely used to improve the hardness, strength, and heat and wear resistance of cast iron.

Ferrovanadium — ELECTROMET foundry grade ferrovanadium has good solubility. Vanadium improves toughness.

FOR CUPOLA ADDITIONS

"EM" Briquets—For adding chromium, manganese, silicon or zirconium to cast iron. "EM" briquets are scientifically designed for maximum alloy recovery in cupola melting.

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To top it off, AL Stainless is easy to fabricate, and we produce it in every shape or form a fabricator may require. Check up on its money-making possibilities for *you*, either in your products or your equipment, *and let us help!* ● ***Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.***

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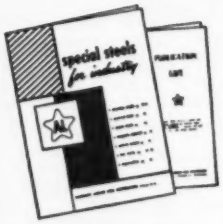

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Bullish Note in Pittsburgh . . . The used and rebuilt machinery trade in Pittsburgh is voicing strong notes of optimism for business in 1956. Several key points characterize the market.

First, customer inquiries remain heavy for virtually every type of equipment. Sales are reportedly as high as can be expected in the light of the continuing shortage of top grade merchandise.

Secondly, no one is overlooking the numerous major industrial expansion programs in the area and the continued need for rebuilding much of the existing equipment.

A third point dealers are keeping in mind is the current extended delivery delay of new equipment.

Some customers have bid as high as 75 pct of the price of new equipment for urgently needed used machinery.

On The Other Hand . . . On the other side of the ledger, dealers are having their hands full trying to find and purchase equipment for resale. Prices to dealers are increasing, and in this business, there's an old saying that you make more money buying equipment than selling it.

Normal sources of used equipment to dealers have been reduced noticeably in recent months.

Due to high production demands in nearly all types of industry, customers are buying new and used machinery, retaining in many cases, the older equipment or having it rebuilt.

As new machinery and steel mill equipment fabricators begin to seriously cut into order backlogs, it's expected that more used equipment will become available. Until then, however, dealers are going to have to keep beating the bushes for equipment.

Electrical Rebuilders Prosper . . . Electrical rebuilders continue to prosper, with work forces going at full production. Manufacturers are reporting heavy order backlog now where none existed a year ago.

During the slow production period of 1954, a number of firms made important strides toward increasing the efficiency of their operations. Today, this is showing up sharply in terms of higher output utilizing the same work force.

What About Machine Shops? . . . The small machine shops came up with relatively decent business during the latter part of 1955. While this upsweep is still too young to be considered permanent, it has at least arrested the earlier mortality rate.

The recent general surge in business has saved any number of smaller shops and provided additional incentive for much needed modernization. Used machine tool dealers report that this all-but-dead market is snapping back to life again.

'55 Should Show Profits . . . With dealers' unit sales figures at an all-time high, as the result of the past year's trend to larger equipment and whole mill installations, 1955 should show a good profit picture.

With the exception of a brief downtrend period in second quarter, business increased steadily during the balance of the year.

MDNA Is Optimistic . . . Latest forecast from the Machinery Dealers National Association headquarters in Washington is on the bright side regarding 1956.

Industry observers note that all statistical and economic forecasts indicate that the year will be excellent for those dealers who work diligently for an increase in business. Indications are, it's noted, that '56 will be the most potent peacetime year ever experienced by American businessmen.

CONSIDER GOOD USED EQUIPMENT FIRST

ANGLE BENDING ROLLS
1⅜"x1⅜"x⅜" Niagara No. 3
4½"x4½"x⅝" Amplex PRR Horizontal

BALERS
#123P-66 Logemann, Charging Box 66x18x24. Produces Bale 125 to 150 lbs.
Logemann Baler, Charging Box 72x12x18". Produces 300 lb. Bale.

BENDING ROLLS
8' x 3/16" Milton Slip Roll Forming Machine
8' x ⅜" Hilles & Jones Pyramid Type
12' x ⅜" Cleveland Pyramid Type
16' x ¾" Bertsch Initial Type Bending Roll
24' x ½ Hilles & Jones Pyramid Type

BRAKES—LEAF TYPE
12' x ⅜" Dreis & Krump
12' x ⅛" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
10' x ⅜" Cincinnati #130-10
12' x 5/16" Pacific Hydraulic, 300 ton

BROACH
Model VP-4-40-40 American Vertical Hydr. Broach. Max. Capacity 60 ton. Stroke 40", Motor Drive

BULLDOZER
#27 Williams & White, 22" Stroke, 16" x 80" Face of Crosshead

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span 230 Volt D.C.
5 ton Northern	50' Span 230 Volt D.C.
5 ton Cleveland	96' Span 230 Volt D.C.
7½ ton P&H	65' Span 440/3/60 A.C.
10 ton P&H	58' Span 230 Volt D.C.
10 ton Milwaukee	80' Span 230 Volt D.C.
With 5 ton Auxiliary	
10 ton P&H	96' Span 220 Volt D.C.
15 ton P&H	56' Span 230 Volt D.C.
20 ton P&H	60' Span 230 Volt D.C.
20 ton Toledo	75' Span 550/3/60 A.C.
30 ton Alliance	50' Span 230 Volt D.C.
With 10 ton Auxiliary	
120 ton Whiting	80' Span 220/3/60 A.C.
With 10 ton Auxiliary	

FORGING MACHINES
1" to 5" Acme, Ajax, National
1", 4", 5" National High Duty, Air Clutch

FURNACES
Hevi-Duty Electric Furnace, Hot Zone 18" high, 26" Wide Opening, 10'9" Deep I.D.
Sunteam Stewart Gas Fired Furnace 12" x 36" x 36"
Lee Wilson Natural Gas Annealing Furnace. Work Dimensions 42" coil, 96" Piling Height
Ther-Monic Induction Heater Model 1400
2 ton Swindell Dressler, Top Charge
2.7 ton Heroult Top Charge
15 ton Heroult Top Charge

HAMMERS—BOARD DROP—STEAM DROP STEAM FORGING—800 lb. to 20,000 lb.

HAMMERS—MISC.
#30 Acme Nazel, Capacity 4" Square 2000 lb. Chambersburg Ceco-Drop

LEVELERS—ROLLER
52" McKay 17 Rolls 3⅝" Dia.
72" McKay 15 Rolls 4¼" Dia.

PRESSES—HYDRAULIC
150 ton HPM Double Acting, 36" Max. Ram Travel Bolster 36" x 36"
300 ton United Steam Hydr. Forging Press
530 ton Baldwin Southwark 12" Stroke 48" x 25" Between Columns
800 ton Clearing 48" Stroke, Bed Area 48" x 48"
1000 ton Lake Erie Double Acting 46" Stroke, Bed Area 72" x 146"
1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
2045 ton Birdsboro, 4 Columns, 14" Stroke Platen 42" x 40" Daylite 47"
4500 ton B-L-H Hydr. Forging Press

PRESS—Straight Side
Clearing Mosel Tr-41500-200 Triple Acting. Strokes 40, 32, 14". Bed Area 100" x 200"
Verson 81-40 Mech. Eccentric Type Single Point Suspension Press, 200 ton, 30" Stroke

PLANER—PLATE EDGE
30' x 1¼" Southwark, 16 Pneumatic Jacks
35' x 1½" Southwark, 16 Pneumatic Jacks

PUNCH & SHEAR COMBINATIONS
#1½ Buffalo Universal Ironworker
Style EF Cleveland 36" Throat, Punch 1¼" thru 1"
Style W Cleveland Single End, 60" Throat, 312 Ton

ROLL—PLATE STRAIGHTENING
72" Bertsch, Seven 7" Dia. Rolls

ROLLING MILLS
8" x 10" United Single Stand Two High
12" x 16" Phila. Single Stand Two High
15" x 28" Farrel Single Stand Two High
15" x 30" G & M Single Stand Two High
16" x 24" Farrel Single Stand Two High
22" x 40" Achen, Single Stand Two High
22"x12"x40" Lewis 3-High Sheet Mill

ROLLS—FORMING
8 Stand Rafter Tube Forming Machine, Spindle 1⅞"
5 Stand Bliss Roll Forming Machine, Shaft 2⅞"

SHEAR—GATE

SHEAR—ANGLE
6 x 6 x ⅝" Hilles & Jones

SHEAR—BAR
#1 H & J Guillotine, Capacity 3½" Square, 4" Round

SHEARS—ROTARY
⅛" Kling #250, With Flanging Attachment
½" Quickwork Whiting #04A—NEW 1953

SHEARS—SQUARING
10' x 12 Ga., Niagara No. 501B
12' x 316" Cincinnati #1412
12' x ⅝" Loy & Navrath

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Surplus Mfg. Equipment Inventories Purchased

5" Bar #45 Giddings & Lewis Horizontal Table Type Boring Mill Serial #18151.

3" Bar Tri-Way Universal Boring Mill Serial T2430.

2-3-4 Spindle Leland Gifford Drills.

#300 Hanchett Vertical Surface Grinder Ser. #300-17 capacity 13" x 72".

(2) 24' x 8' x 10" Thick T Slotted Floor Plates.

3V Van Norman Vertical Miller—Late.

26 SU Van Norman Universal Ram Type Milling Machine Serial 26-5372.

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Dexter 1-8880

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22" x 336" centers MONARCH model M Heavy Duty Lathe—two carriages, M.D.
No. 5 CINCINNATI High Power Plain Miller with motorized overarm.
No. IL GISHOLT Universal Turret Lathe—new 1946.

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A. C. MOTORS
3 phase—60 cycle

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Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT	6900	1187
1	1500	G.E.	MT-498	2300	360
1	1100	G.E.	IM	2300	720
1	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1196
1	700	A.C.		2300	500
1	500	Whse.	CW	550	350
1	500	G.E.	M-569Z	2200	1180
1	400	Whse.	CW-960A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	MT-442Y	2200/4000	263
1	350	G.E.	1M-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-559S	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	505
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150	(unused) Whse.	CW	2300	435
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	1M-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
2	650	G.E.	FT-559BY	440	3570
2	450	Whse.	CS-1420	2300/4150	354
1	400	G.E.	IE-15B	2200	1165
1	400	G.E.	IK	2200	500
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440	900/450
1	150	Whse.	CS-8568	440	880
1	150	Whse.	CS	440	580
2	125	Al. Ch.	ARW	2200	1750
1	100	Whse.	CS-876C-TEFC	440	710

SYNCHRONOUS

2	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
2	735	G.E.	ATI	2200/12000	600
1	500	Ideal	SM	2300/4160	1800
2	500	G.E.	TS-7567	2200	1200
1	450	Whse.		2300	128.5
1	450	Whse.		2700	450
1	400	G.E.	TS-7565	2200	1200
1	400	G.E.	TS	2200	400

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2	3000	Whse.	Mill	525	600
6	1500	Whse.	Mill	525	600
1	1250	G.E.	MCF	600	350/790
4	800	Whse.	Encl.	525	600
4	700	Whse.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	500	Whse.	Mill	250	285/710
1	450/250	Al. Ch.	Mill	375/250	250/1000
1	450	Whse.	SK	230	450/600
1	350	G.E.	CD-169	230	1150
1	200/250	El. Dy.	Ped. Brg.	230	400/1200
1	200	Whse.	SK-210	230	400/800
1	180	G.E.	MPC	230	400
1	150	Whse.	SK-201	230	300/900
2	125	Whse.	SK-184	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	El. Dy.	30-S	230	450/1350
2	100	El. Dy.	30-S	230	475/950
1	80	Reliance	651-T	230	575/1150
3	50	Whse.	SK-131.5	230	600/2200
1	40	G.E.	CD-123	230	500/1000
1	40	Whse.	SK-140	230	500/1700
1	32½	Whse.	SK-150	230	400/1200
2	25	Whse.	SK-93	230	1800
1	20	Cr. Wh.	D.P.B.B.	230	1150/2400
1	20	Whse.	SK-123	230	400/1200
1	15	G.E.	CD-85	230	575/2300
3	15	Whse.	SK-100L	230	500/1500
1	15	Reliance	155-T	230	400/1600
1	10	Whse.	SK-103	230	400/1600
1	10	Al. Ch.	E-122	230	300/1200
4	10	Whse.	SK-91	230	250/1000
1	7½	G.E.	CD-75	230	690/2070
1	7½	G.E.	CD-85	230	450/1350
4	5/7½	Reliance	T.E.F.C.	230	337/1350

MOTOR GENERATOR SETS

Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whse.	720	600	4160/2300
2	1250	Whse.	720	600	2300
1	500	Cr. Wh.	720	600	2300/440
2	500	Whse.	1200	125/250	2300/440
1	400	Cr. Wh.	1200	125/250	2300/440
1	300	G.E.	1200	250	2300
3	200	G.E.	900	125/250	2300
1	150	G.E.	1200	250	2300
1	100	Whse.	900	250	2300
1	100	Cr. Wh.	1200	125	440/220
1	75	G.E.	1200	250	440/220
3	50	G.E.	1200	250	440/220

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234 CFM	100 PSI	9 x 9 Ing. ES-CPT. T
252 CFM	3500 PSI	Werth. (4) stage HB4
268 CFM	500 PSI	10-4¼ x 10 Ing. XOB
283 CFM	35 PSI	10 x 7 Ing. ES (10) available
368 CFM	100 PSI	12 x 10 Ing. ERI
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No. 2LMS Leland-Gifford, single spindle, High Speed, m.d.
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2 spindle Avey, size No. 1, type B, style VHP, m.d., 8" overhang
2 spindle No. 3MA6 Avey High Speed, m.d.
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200	Westg.	2300/4000	250/275
200	Ridgeway	2300	250
178	G.E.	440	125
150	G.E.	2300	125/250
150	A.G.	2300	275
150	Westg.	2300	125/250
150	G.E.	440	275
100	G.E.	2300	250
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18"/38" x 60" cc Nebel gap lathe, 1941.
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M-24 Kearney & Trecker Mfg. Mill
1-18 Cincinnati production.
2-18 Cincinnati production, late model.
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60" x 48" x 10' Ingersoll adj., rail planer type.
No. 3H K & T plain horiz., new 1942.

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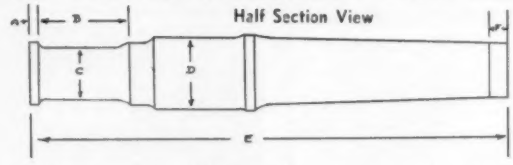

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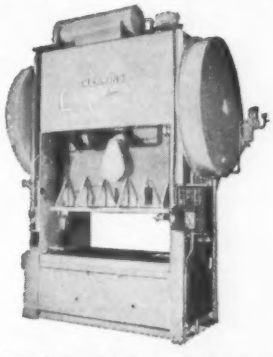

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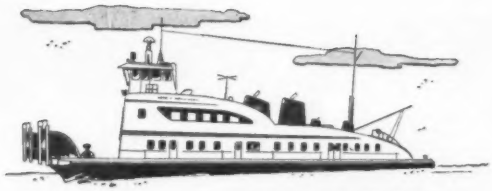

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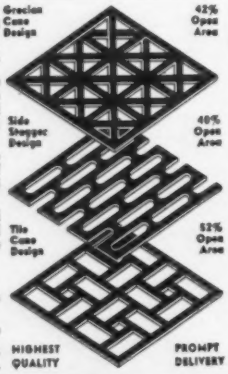

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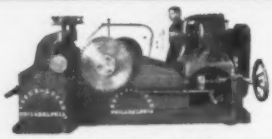

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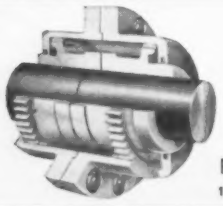

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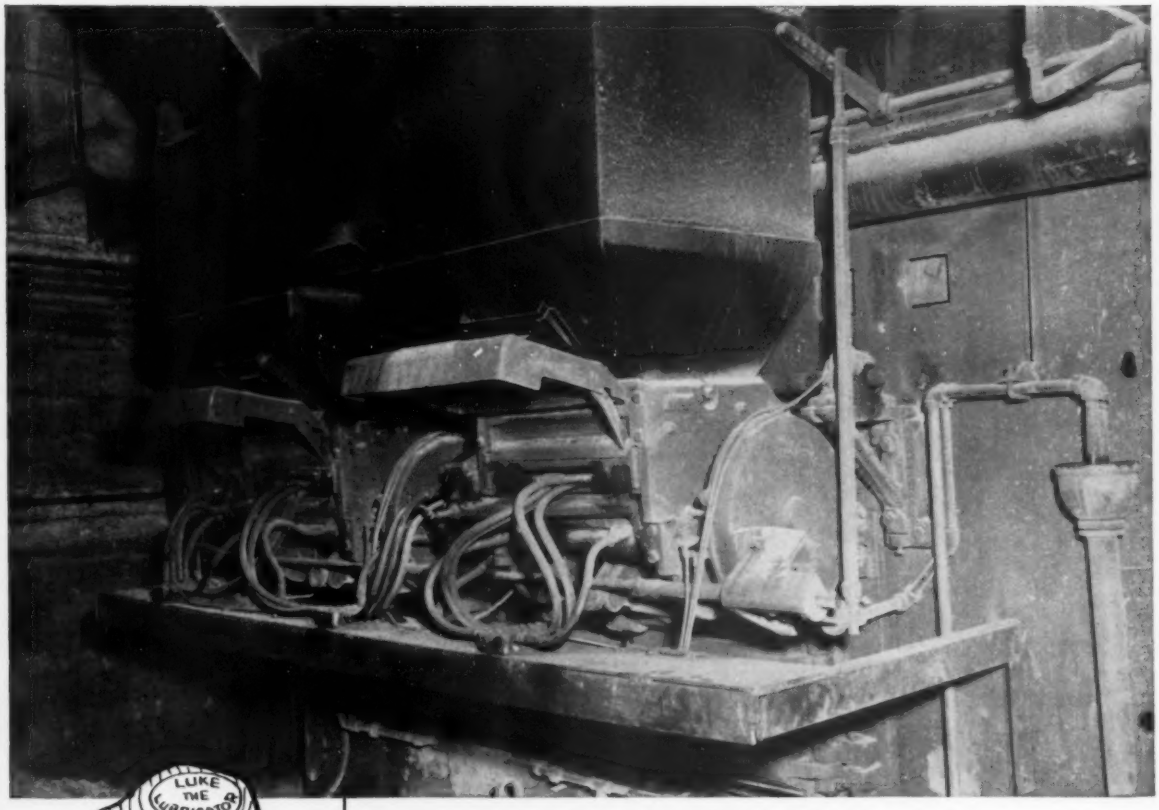

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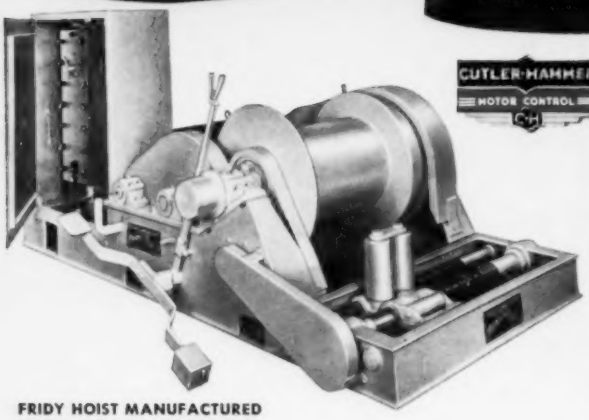

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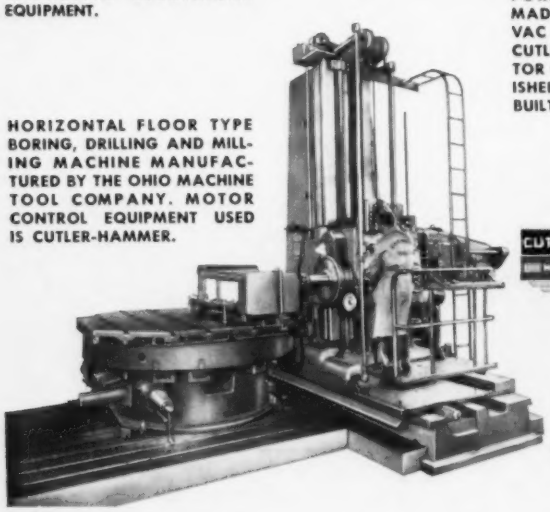

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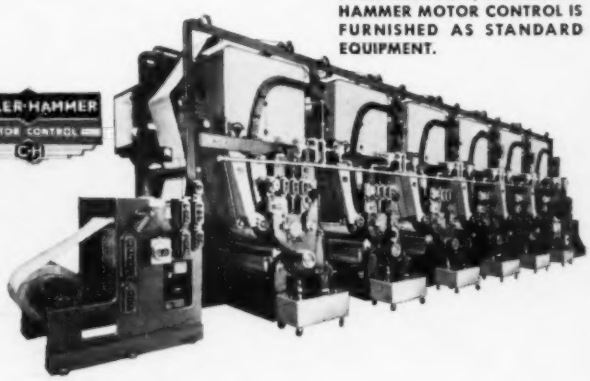

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